American Artisan

THE WARM AIR HEATING AND SHEET METAL JOURNAL

FOUNDED 1880

The aluminum roof and tower of the enlarged Eastman Kodak Company office building is one of the distinguishing features of the Rochester, N. Y., skyline. At night under flood lights, the soft sheen of the metal brings out every detail of the excellent architectural design. There is no wood in the tower, a factor which necessitated some unusual fabrication methods. Details of the project are in this issue.

JUNE 22, 1931

Let Inland throw light on your sheet steel problems

WHEN it takes a steel company many years of intense study to "know steel," it would naturally be difficult for users of steel sheets to select the best material at all times for the job at hand. Yet your business success demands that you always furnish the proper grade. If the steel fails quicker than the customer expects, careful workmanship is forgotten.

A safe policy is to standardize on Inland Sheets—thus securing as good sheets as can be made for the purpose. Every Inland Sheet is the result of nearly 40 years' experience, of wide research and knowledge, and of complete control of materials from mine to you, assuring complete satisfaction on every job that passes through your hands. INLAND STEEL COMPANY, 38 South Dearborn St., Chicago.

INLAND STEEL

ABLE SERVANT OF THE CENTRAL WEST

Sheets
Bars
Bands
Plates
Structurals
Rails
Track Accessories
Rivets
Billets

ets
ets

WORKING IN THE DARK?

INLAND OPEN HEARTH STEEL

Let Inland throw light on your sheet steel problems

WHEN it takes a steel company many years of intense study to "know steel," it would naturally be difficult for users of steel sheets to select the best material at all times for the job at hand. Yet your business success demands that you always furnish the proper grade. If the steel fails quicker than the customer expects, careful workmanship is forgotten.

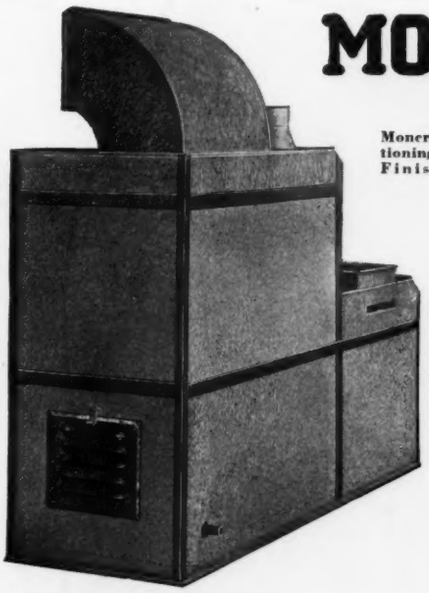
A safe policy is to standardize on Inland Sheets—thus securing as good sheets as can be made for the purpose. Every Inland Sheet is the result of nearly 40 years' experience, of wide research and knowledge, and of complete control of materials from mine to you, assuring complete satisfaction on every job that passes through your hands. INLAND STEEL COMPANY, 38 South Dearborn St., Chicago.

INLAND STEEL

ABLE SERVANT OF THE CENTRAL WEST

Sheets
Bars
Bands
Plates
Structurals
Rails
Track Accessories
Rivets
Billets

MONCRIEF FURNACES



Moncrief Air Conditioning Gas Furnace. Finished in Apple Green

The Aristocrat, finished in Cardinal Red, with Moncrief-Sphinx Conversion Gas Burner

GAS

...Friend of the Moncrief Dealer

Gas is making tremendous gains—soon will be available for heating millions of homes in new territories.

This presents big opportunities to the dealer selling the complete Moncrief line.

He has the new Moncrief Air Conditioning Gas Furnace, the very acme of efficiency, economy and convenience in home heating;

And the Aristocrat, the newest Moncrief which, equipped with the Moncrief-Sphinx Conversion Gas Burner, Moncrief Blower and automatic controls, makes a modern air conditioning plant at moderate cost.

The Moncrief-Sphinx Conversion Gas Burner can be installed in any Moncrief Furnace. It supplies heat at costs that compare favorably with burning hard fuels.

Send for circulars of the complete Moncrief line; also for our big Pipe and Fittings Book

Series "C" Cast Furnaces
Aristocrat Furnaces
Moncrief-Sphinx Gas Burners
Moncrief Steel Furnaces
Moncrief Air Conditioning Gas Furnaces
Moncrief Blowers

We supply everything used on a warm air heating job

THE HENRY FURNACE AND FOUNDRY COMPANY
3471 EAST 49TH STREET CLEVELAND, OHIO

Sky LIGHTING !

The illustration shows the Chicago and Northwestern Railway freight transfer house at Proviso, Illinois. It is one of the largest single roofs ever laid in the United States, covering 21 acres. Three and a half miles of skylights and 420 oval dome-type ventilators were installed.

To insure the permanence of this immense structure, all sheet metal work was fabricated from GOHI.

For every sheet metal need, large or small, GOHI offers outstanding advantages. It is pure iron alloyed with the right amount of copper, that gives GOHI the ability to withstand the most extreme corrosive conditions.

GOHI is uniform, dense, homogeneous, soft and ductile—easily fabricated. Saves labor and prevents waste of material.

GOHI is the one metal for discriminating sheet metal workers. It offers the lowest-cost-per-year service that any sheet metal can give.

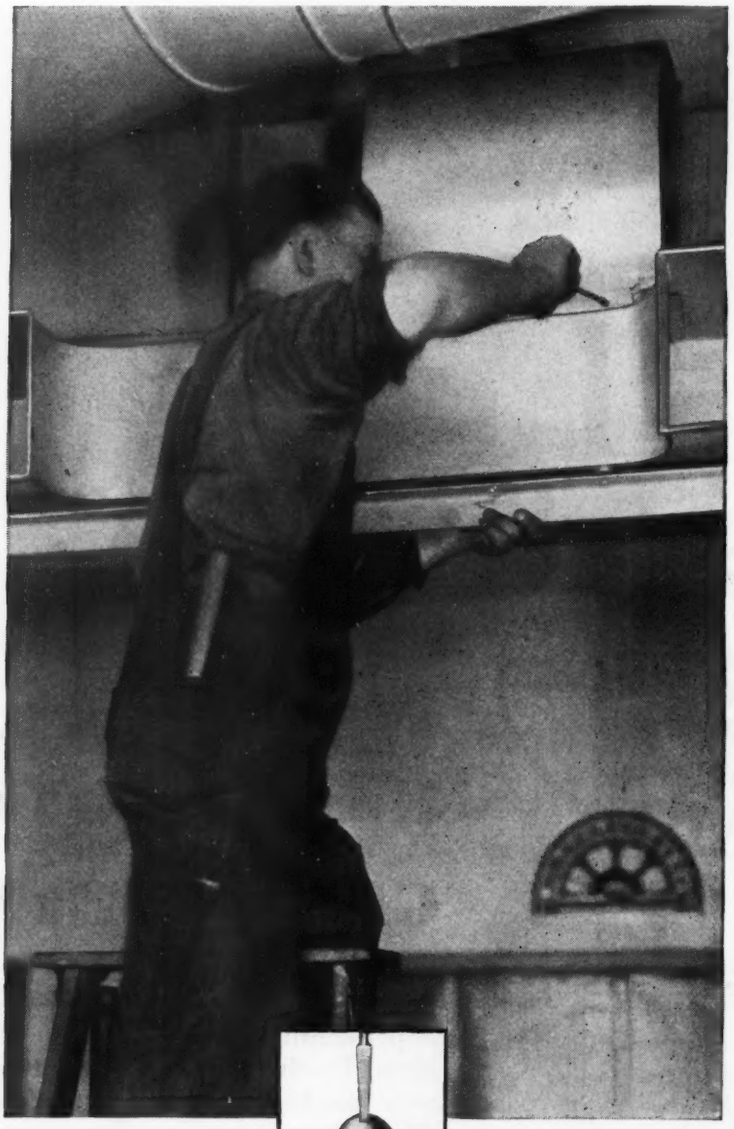
THE NEWPORT ROLLING MILL COMPANY

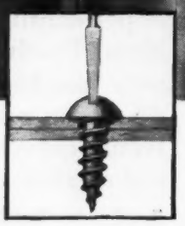
Newport, Kentucky

Published Every Other Week by Porter-Spofford-Langtry Corp., 139 North Clark Street, Chicago, Illinois. AMERICAN ARTISAN—the Warm Air Heating and Sheet Metal Journal—entered as second class matter, January 29, 1930, at the Post Office at Chicago, Illinois, under the act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record.

INDEX PAGES—10 and 48 [VOL. 100, No. 13—$2.00 PER YEAR] BUYERS' DIRECTORY—44 and 46

This is the SIMPLEST way
—to join sheet metal





Just turn in the Screw

Only one easy operation required. Just turn a Hardened Self-tapping Sheet Metal Screw into a hole, drilled or punched in sheet metal. As it is turned in, the Screw forms a thread in the metal, like a tap, and draws the parts firmly together. No other way of joining sheet metal or making fastenings to sheet metal is so simple, speedy and cheap. Thousands of sheet metal workers use these unique Screws. Fifty percent of the time and labor is saved on many jobs through the elimination of tapping, fumbling with bolts and nuts, unhandy riveting and other fastening difficulties. Try Hardened Self-tapping Sheet Metal Screws on your own work. Mail the coupon for free samples.

A stronger fastening, too

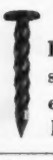
PARKER-KALON HARDENED SELF-TAPPING **Sheet Metal Screws**

PATENTED — APR 1, 1919 — No. 1299232 — MAR. 28, 1922 — No. 1411184 AUG 14, 1923 — No 1465149 — FEB. 10, 1925 — No. 1526182 — OTHERS PENDING

Parker-Kalon Corporation, 190 Varick Street, New York, N. Y.
Send me free samples of the products checked. ☐ Sheet Metal Screws. ☐ Screwnails. ☐ Masonry Nails.

Name and Co.....

Address .....



Hardened Screwnails
For securely fastening sheet metal to wood. Drive easier. Hold four times better than ordinary nails.

Hardened Masonry Nails
For making fastenings to brick, mortar, concrete, etc. Hammer them in—no easier, cheaper way.

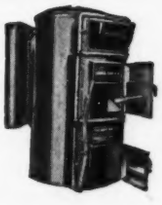
Mention AMERICAN ARTISAN in your reply—Thank you!

POPULAR NEW FURNACE YIELDS HOME OWNER CLEAN, EASY HEAT

Reports from furnace retailers who have placed new Western Gas Furnaces show that home-owners appreciate gas heating with such a dependable plant as the Western. They are quick to see the benefits in a clean, ever-present fuel (No dusty deliveries, no worry caused by a suddenly emptied bin.) They realize the ease of turning a handle instead of swinging a shovel when the temperature drops. "One of the main reasons why I'm so pleased," said a recent purchaser, "is the clean, useful basement I have made out of a dusty old cellar."

The furnace itself is attractively finished, either galvanized or in green lacquer. It's as easy to keep clean as the top of your dresser. And easy to operate, too. Furnished for either automatic or manual control.

Write for our new catalog. Study the construction. You'll find plenty to tell your customers.



The Western coal-burning furnace is still building an enviable reputation in every state in the Union, in every province in Canada. Write for the name of our jobber nearest you.

For Southern Distribution
WESTERN STEEL PRODUCTS CO.
521 Westport Ave., Kansas City, Mo.

WESTERN STEEL PRODUCTS CO.

130 COMMONWEALTH AVENUE, DULUTH, MINN.

Say you saw it in AMERICAN ARTISAN—Thank you!

A New Furnace Blower

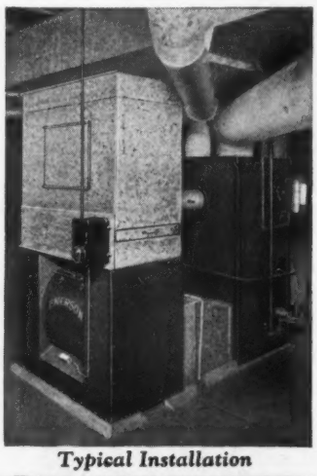
Self-Contained, Adjustable from 955 to 2540 C. F. M.

A tremendous improvement in blowers for warm air heating systems. Simplifies installation problems—this one unit, adjustable for varying capacities, takes care of 90% of your jobs. No special wiring—connects to light socket. Unusually quiet operation. Direct drive. No belt or pulleys. Motor is spoke mounted in rubber. No brushes or starting devices. No radio interference. Adaptable for cooling and ventilation in Summer.

Write for full details and name of the wholesaler nearest you.

THE EMERSON ELECTRIC MFG. CO.
2018 Washington Avenue, Saint Louis
806 W. Washington Boulevard, Chicago
155 Sixth Avenue, New York City

Distributors . . . .
Some desirable territory still open. Write.



Typical Installation

Important
8 speeds, 300 to 820 r. p. m. available from which to choose the 3 most desirable operating speeds. 3 speeds operating with snap switch.

EMERSON
FURNACE BLOWER

Made by the Makers of Emerson Furnace Fans and Motors

MIDLAND CONSTRUCTION

Speaking of construction, we simply state that all MIDLAND units are scientifically and sturdily built. No item is overlooked and many exclusive and unusual features are built into MIDLAND units.

RIVETED

Bridges, skyscrapers and locomotives all are *riveted.* This method is adopted by MIDLAND because it has been proven and found successful through the steel age.

Each rivet binding together the MIDLAND units as if they were made of one piece. This construction gives you an unusual selling feature as well as the satisfaction of knowing a unit so constructed will give satisfactory service and remain permanently gas-tight.

MIDLAND FURNACE CO.
COLUMBUS, OHIO ▼ DES MOINES, IOWA

Founded 1880

American Artisan

THE WARM AIR HEATING AND SHEET METAL JOURNAL

Covering All Activities
IN
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

VOL. 100, NO. 13

JUNE 22, 1931

We solicitate five minutes of your time to read the editorial. Not that it is a masterpiece of writing, but because we feel that it introduces a feature which is going to mean much to the contractor doing forced air heating. Then turn to the inside back cover and read the advertisement.

* * *

Perhaps you have often wondered how they heat those Hollywood "Talkie" studios where even the faintest sound registers on the sound track. And by the way, most of these studios are warm air heated, too. If you want to know how this trick is turned, the leading article in this issue tells all about it.

* * *

In Rochester, N. Y., the Eastman Kodak Company has just completed an office building enlarging program where the roof and tower are sheathed in aluminum. Not a piece of wood was permitted, so the sheet metal contractor had to work out some unusual fabrication and erection methods.

Contents

JOSEPH D. WILDER
Editor

Published Every Other Monday

139 North Clark Street, Chicago—Telephone Central 7670

Fred D. Porter, ***President*** **John C. Langtry,** ***Vice-President*** **Howard H. Bede,** ***Secretary***

Circulation Manager: **John R. Hannon** ***Business Manager,*** **Etta Cohn** ***Advertising Representatives:*** **Charles E. Kennedy**

New York Office: 295 Madison Avenue, Room 1109, ***Tel. Ashland 4-5342*****—L. R. Hudson,** ***Eastern Representative***

Yearly Subscription Price**—In United States, $2.00; Canada, $3.00; Foreign, $4.00; Single Copies, $.25**

Perfected warm air systems

DEMAND

perfected oil heat

ALONG with the rapidly growing demand for the highly improved warm air systems available today, has come a parallel demand for Silent Automatic, which makes warm air heat both *clean* and *odorless.*

Heating engineers everywhere have found that Silent Automatic not only makes warm air sales easier, but insures *complete* satisfaction with such installations. Indeed, in some territories, from 40% to 50% of all Silent Automatics are installed with warm air furnaces.

Harold J. McGill, Westport, Conn., heating man, says: "We have installed many burners in steel and cast iron warm air furnaces, obtaining excellent results as to quietness, economical running and general all-around satisfaction. We like 'Silent's' wiping flame, which gives the even distribution of heat so essential in warm air installations."

From A. G. Hood, of the Southern Tier Heating Corp., Corning, N. Y., comes this letter: "A large percentage of our 'Silent' installations have been in warm air furnaces, and the economy and efficiency they are giving is a surprise to every user."

Are you profiting from Silent Automatic's universal public acceptance, which is building business and increasing the unit value of individual installations for so many warm air heating men? Mail the coupon today for complete information regarding this opportunity in your own territory.

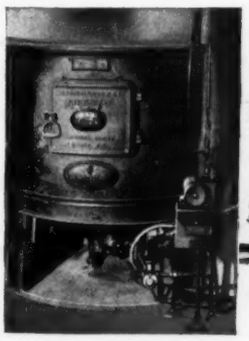
SILENT AUTOMATIC CORPORATION
12001 E. Jefferson Avenue Detroit, Michigan

For Warm Air, Steam and Hot Water Heating Systems—Old or New Homes

SILENT AUTOMATIC

THE NOISELESS OIL BURNER

Made by the World's Largest Producer of Domestic Oil Burners



The home of G. Francis Greenridge, President of the Genesee Paint and Glass Company, Utica, N. Y., is heated with Silent Automatic and warm air.

All Silent Automatic models listed as standard by Underwriters' Laboratories

C O U P O N

Silent Automatic Corporation, Detroit, Michigan

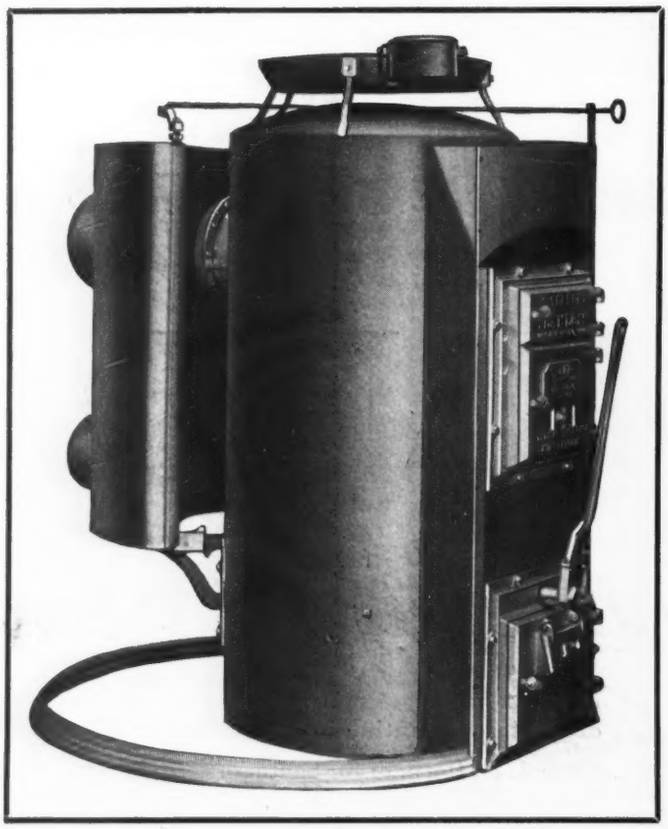
Please send me, without obligation, a copy of your booklet, "Oil Heat for the Warm Air Furnace", giving information on the installation of Silent Automatic with warm air systems.

Name_____

Street_____

City_____ State_____ (408)

Say you saw it in AMERICAN ARTISAN—Thank you!



WHY Is the Waterbury a Better Furnace to Sell?

Here's the Reason—

The Waterbury is the only furnace guaranteed permanently gas-tight. Body and radiator are ONE-PIECE, all-steel construction, with every seam acetylene welded.

The Waterbury has an exceptionally efficient ***controlled humidifier,*** which moistens the air adequately for real comfort.

The Waterbury's ***extra heavy construction*** adds years of life, and replacement of parts is rarely necessary. All steel parts are guaranteed for ten years.

The Waterbury is extremely ***economical.*** Every size Waterbury has a special size radiator that assures the production of the greatest amount of heat from the fuel consumed.

The Waterbury Franchise Is a Money-Maker

Successful furnace dealers do not sell furnaces at all—they sell comfort and health. We'll tell you how to do it, too.

When you are selling furnace performance and satisfaction instead of price, you can make substantial profits. The wonderful satisfaction that the Waterbury gives its users makes them boosters, and helps you make many sales. The Waterbury Merchandising Sales Plan helps you close your prospects. Write for complete information about the Waterbury Franchise—it means money to you.

The Waterman-Waterbury Co.

1122 Jackson Street, N. E. Minneapolis, Minnesota

Complete Stock Carried At

Philadelphia Yakima San Francisco
Pittsburgh Chicago Kansas City

Guaranteed Gas-Tight Permanently

Mention AMERICAN ARTISAN in your reply—Thank you!

Volume 100

American Artisan

THE WARM AIR HEATING AND SHEET METAL JOURNAL

Number 13

Engineering at Mail Order Prices

EVERY contractor who hasn't got his head buried in the sand realizes that gigantic changes in warm air heating are rolling in on us with an inevitableness which is not far short of frightening. Not more than two years ago we could contemplate these changes with a large measure of righteous satisfaction and anticipation.

But today the perspective isn't so rosy. Contractors have found that while they were patting themselves on the back and assuring one another that such changes were the just dues of an industry which had waited long enough for things to break, old man public had stepped out and found himself another toy to play with. In one bound he had hurdled the barrier of warm air heat and faced the home stretch of air conditioning. Much to the contractor's surprise the public wanted to know about air conditioning while we were still thinking and talking about furnace heat.

We sat tight too long.

Right now the insurmountable obstacle is the problem of getting all the necessary facts to enable contractors to sell and engineer air conditioning before the public steps out and finds some other industry which can give them what they are crying for. It does seem, however, that most contractors can talk air conditioning if only they can actually deliver the things they must promise.

The thing badly needed is honest to goodness engineering. Unless this engineering is made available the warm air heating contractor will be helpless to meet the demand for air conditioning and the inevitable inroads made by heating men from other fields.

This need has been strongly impressed upon us during the past year. Dozens and dozens of letters have come to us asking where this engineering information might be secured at prices within reason.

We have tried to co-operate with these requests to the best of our ability, yet real engineering has been expensive.

It is with real pleasure, therefore, that we take some credit for our part in persuading Platte Overton to make his engineering experience and ability available to contractors at prices which are within the reach of the man wanting to do fan blast heating.

Platte Overton needs no introduction to readers of AMERICAN ARTISAN. His articles which have appeared regularly during the past few months have elicited discussion and comment beyond our expectations. His talks before conventions have always been one of the features of the programs. To a large number of contractors he is personally known and with many of these contractors he has co-operated to land the profitable job.

So far as we know this is a revolutionary step. Platte Overton is a consulting engineer, with some of the largest and best known fan blast heating jobs to his credit. As a consulting engineer at fees of $50 a day, his services were beyond the reach of contractors willing to spend a small sum to try to land that profitable job. Heretofore only those contractors who had the job signed and delivered could afford to use his service to insure that the job on the books would work satisfactorily.

We wanted this experience available to everyone. We felt that if a contractor can't afford to gamble $50 on a job he can and will gamble $15 or less. That was the idea we aimed at.

As a result of this desire to give readers needed engineering service, Overton was persuaded to consider the possibilities of volume production of engineered plans. Through volume it should be possible, we said, for him to reduce the price of his service so that men in every community could afford to pay his price. An analysis of the field was made. Some of the best known contractors in the country were visited and drawn into the discussion. It was a revolutionary idea. Nothing like it had been proposed before and response was instantaneous.

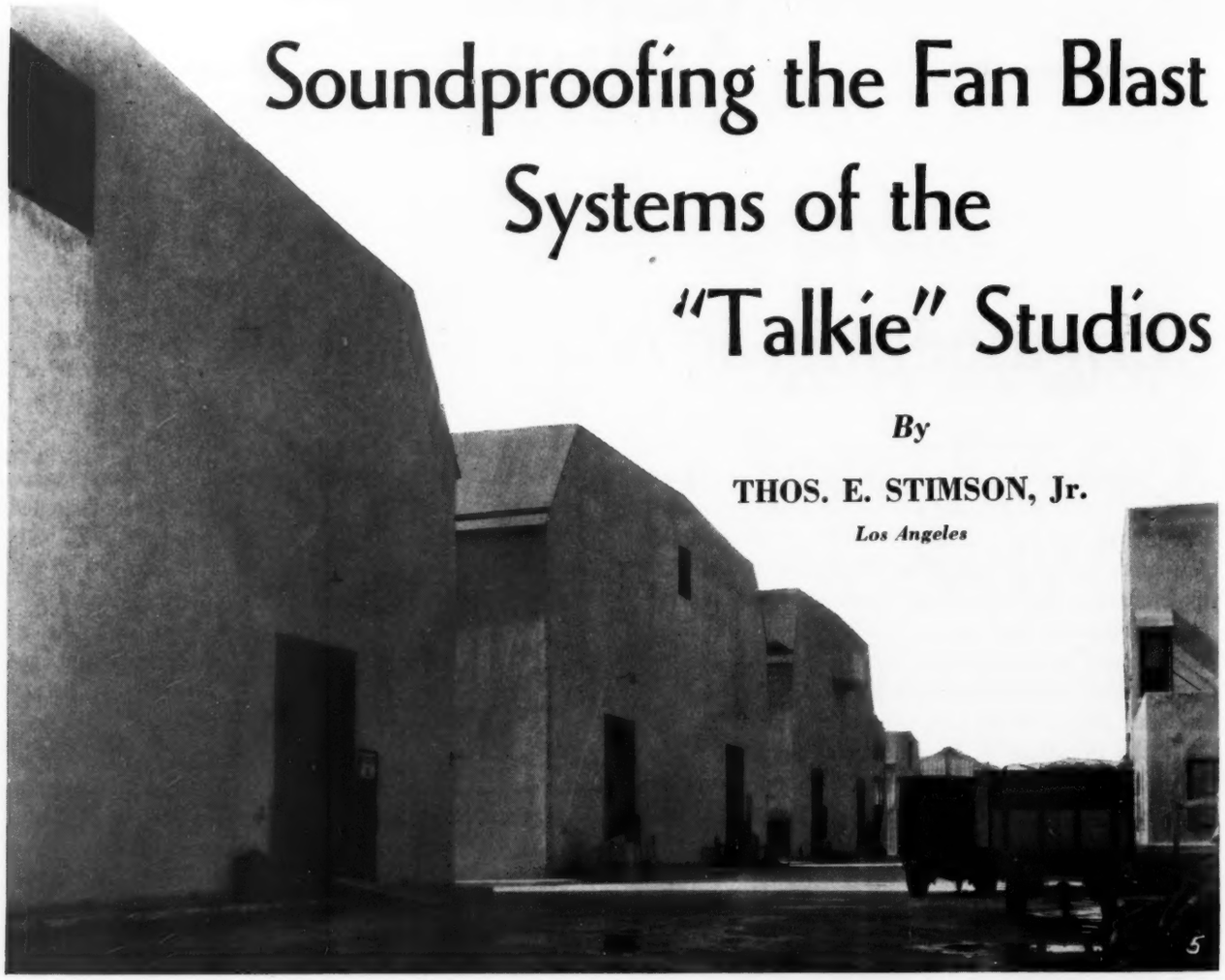
We are frank to admit that we really don't know how it will go. That there is a need for such a service we know, but whether a whole industry, right now on the verge of gigantic changes is ready for such a step time only will tell. We feel that we have started something which contains unlimited opportunities for profitable co-operation between an engineer, contractors and AMERICAN ARTISAN. The response must prove whether we have guessed right or wrong.

Soundproofing the Fan Blast Systems of the "Talkie" Studios

By

THOS. E. STIMSON, Jr.

Los Angeles



Exterior of a row of "Talkie" stages. The buildings are so constructed that no sound can penetrate and all interior noises are deadened. Secrets of construction are jealously guarded

ONE of the most difficult problems of "soundproofing" the new Hollywood motion picture stages in which talking pictures are made, is in connection with the heating and ventilating systems. Highly objectionable noises can enter into the stage interiors via the air systems if special means to prevent the origination and transmission of sound are not taken.

Sound stages consist of large, windowless, one-room buildings entirely insulated from the outside air. An average stage is perhaps 200x 100 feet in dimensions and is from 50 to 80 feet high. Aside from a few doors through which sets and other "properties" may be carried, the buildings have no openings. The construction is especialy designed to prevent the transmission of exterior sounds through the walls or roof and to kill out as rapidly as possible any sounds that originate within. What might be termed a three-ply construction is used for the walls and roof. A typical wall consists of three layers of different building materials, all separated by several inches of space which is packed full of sound-absorbing materials, ranging from rock wool to hair felt.

The interiors are sheathed with sound deadening material. Floors are of concrete, on which rest service floors of tongue and groove hard wood insulated from the concrete by a thin layer of cork.

The writer was recently present in a Hollywood sound stage in which some scene shifters were wrecking a large set. A heavy scaffold rising nearly to the roof, the top consisting of a long platform made up of 2x12-inch timbers, was dismantled by the simple process of clearing away the supports and dragging the structure over with a rope. The collapse of such a scaffold would create considerable noise inside an ordinary building, but the sound qualities of the stage were such that there was but one thump.

It is apparent that such stage buildings, consisting of one large room, present unusual problems to the heating and ventilating engineer. Not even a single unprotected ventilating orifice is permitted. Such an opening might allow the roar of a passing airplane to enter the stage at a time when a talking picture was being "shot." Working conditions demand that inside temperatures

and air circulation be entirely under control. Practically all studios are using air conditioning plants that regulate temperature, humidity, and air flow.

The different picture companies are hesitant in releasing information concerning their particular installations and the methods that they have developed for killing sound in the air systems. For that reason the information given herein, although accurate, is general in nature and few references are made to particular installations.

Because of the amounts of air involved and to better control the noise, most studios have adopted one central air conditioning plant. At the Fox Hills studios of the Fox Film Corporation, for instance, stage buildings are spread over an area of more than a score of acres, but one central plant for the entire group is considered more satisfactory than a number of smaller separate systems.

A short description of the Fox plant will give an idea of the amounts of air involved. The central plant furnishes air to nearly a dozen buildings, more than half of which are sound stages. An average sized stage requires 40,000 CFM of air. The air to a larger stage is moved at the rate of 60,000 CFM by a 12-foot fan weighing seven tons, that is driven by a 40-horsepower motor at a speed of 195-200 revolutions per minute. These fans are all located at the central plant, being mounted in the intakes of the ducts which radiate out to the different structures. They must be of sufficient size to insure a good movement of air within the stage buildings without the necessity of placing booster fans further along the lines.

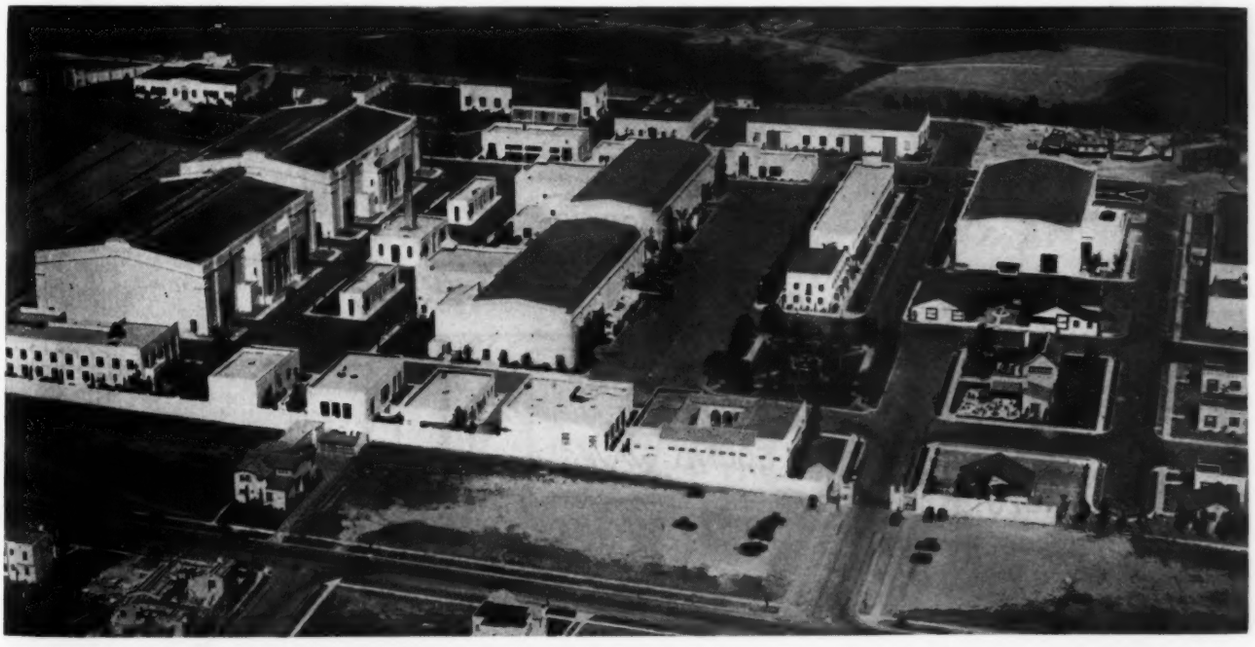
It is obvious that such large installations present unusual difficulties in eliminating noises. It is also apparent that the complete elimination of all noise is of vital importance. The air is kept under forced circulation, and a barely audible hiss which might not be objectionable under ordinary circumstances would be very noticeable when picked up on a sound track and amplified in a motion picture theater.

Low rumblings and beats from the fan, high frequency sounds from the movement of air, and pulsations caused by the air building up in the system and then releasing itself must all be eliminated before the air flows into the stage building. The system must be soundproofed to prevent the transmission of external noise as well as to kill all sounds that originate within the system.

Generally speaking, the same methods have been found effective that have been developed for the elimination of sound in the air conditioning systems of large buildings. However, the sound elimination must be much more complete. The different studios, their research departments, and the different heating and ventilating contractors, have worked out different methods of killing out sound. Different conditions are encountered in every new installation, and what is satisfactory for one system must be modified for another.

It is general practice to carry the air from the central plants to the different stages through underground concrete or tile ducts. These ducts average 5x6 feet in cross section. Due to their size and the fact that they are subjected to strains in passing under roads and other areas, concrete or tile is used in spite of the low sound absorption value of such materials.

Sound eliminating methods may



A Hollywood movie lot. The large buildings which look like windowless and doorless barns are the "talkie" stages. This row of stages is heated from the central plant, the small building with the tall chimney. Warm air is piped across driveways and into the stages. The sound-killing boxes are on these pipe lines

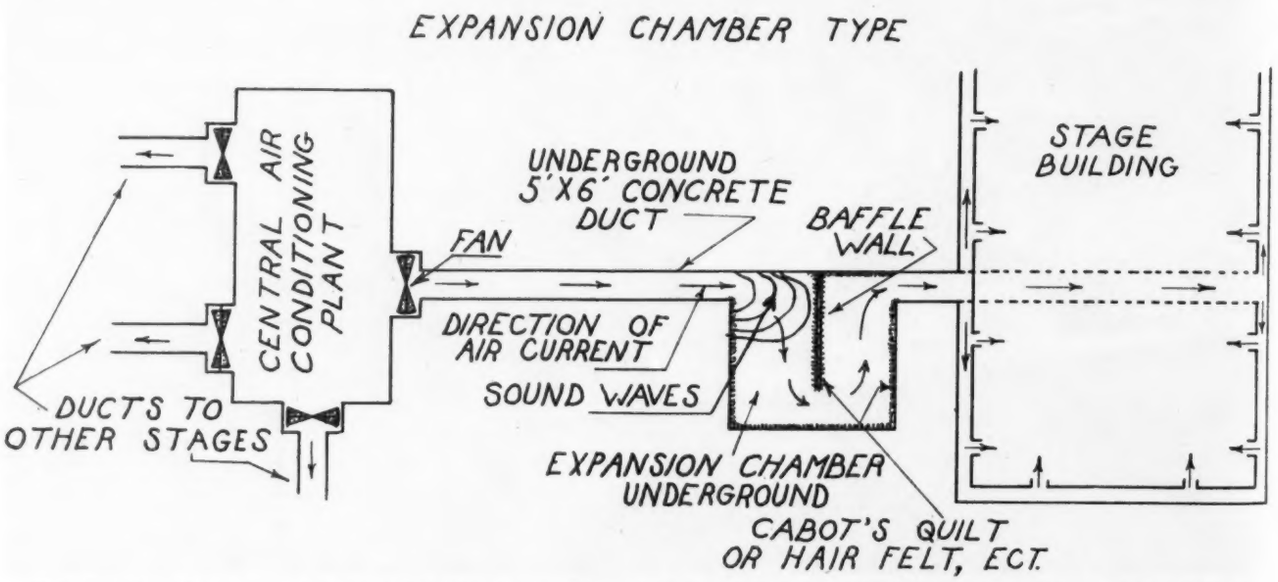
be grouped into two classes—the killing out of sound before the air enters a stage building, and supplementary methods which are used inside of the stage to remove any sounds that may remain or that have originated locally. Either a sound trap or an expansion chamber containing baffles is used as the major sound eliminating device in the air duct outside the building. There are two opposed schools of thought as to where this trap should best be placed. One group holds that in a good installation, the fan should be placed as close to the central heating plant as possible in order that it be away from the stage, and that the sound trap should be as close to the stage as possible so that some noise from the fan will be smoothed out before it reaches the trap and to prevent any local noise leaking into the duct between the trap and the place where it enters the stage. The other group favors placing the baffle immediately in front of the fan so that all fan noises can be killed before reverberations and echoes are set up. No matter in what part of the line the baffling device is located, it is usually a part of the underground system.

At one studio, the trap consists of an underground expansion chamber in the line just outside the stage. The 5x6-foot duct widen out into a room 14 feet square and 9 feet high. Both the entrance and the exit are on the same line at adjoining corners, but free passage is prevented by a single baffle wall extending three-quarters of the way across the chamber. By this means the incoming air is forced to loop around the baffle wall before leaving the chamber. Both sides of the baffle, the walls, ceiling, and floor of the chamber are covered with Cabot's quilt or other soft insulating material. Practically all fan noises are eliminated in this expansion chamber.

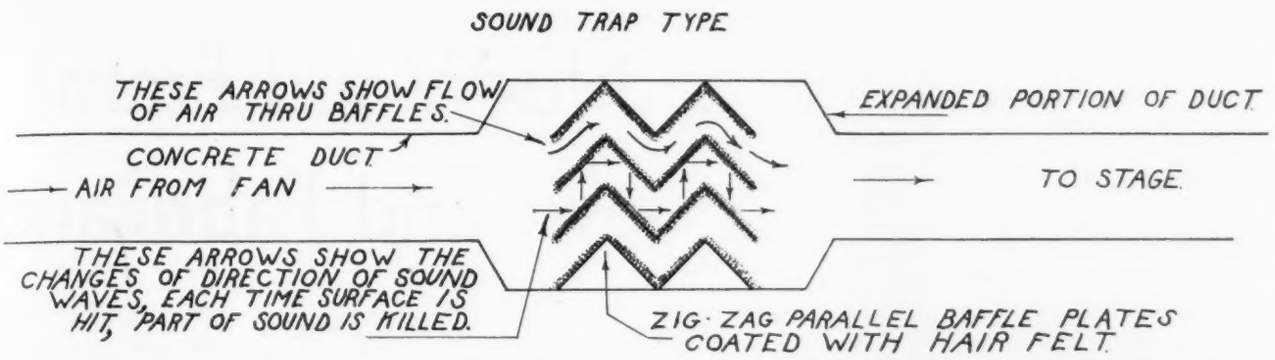
Another type of trap has been developed by H. S. McClelland, heating and ventilating contractor who has made a number of sound stage installations. The device is similar in design to the eliminator in an air washer and consists of several parallel zig-zag baffles that are set up in an expanded portion of the air duct. Each baffle is covered on each side with a one inch thick coat of hair felt. This material was selected after extended comparative tests with other materials. The trap works both on the principal of absorption and reflection. Experiment has shown that for the average size of underground duct, a set of four baffles is more efficient that a smaller or a larger number. There is very little loss of pressure due to friction. Depending upon the velocity of the air, the average trap shows .02 of an inch loss in static pressure on the water column.

At several studios the necessity of using a large external sound trap has been eliminated by a rearrangement of the installation at the central plant. In such cases a gas or steam warm air furnace is used of a type in which the air under treatment passes through a grille of parallel weaving tubes. The furnace is installed in the line on the stage side of the fan, immediately adjacent to it. Whether or not the furnace is in use, the weaving tubes through which the air must pass succeeds in reflecting out a great deal of the fan noise. This arrangement puts pressure on the furnace instead of suction, considered desirable in preventing the leakage of gas fumes into the air supply.

All ducts inside the stage buildings are made up of galvanized iron. The ducts average 60x84 inches in cross section and range from 18 to 24 gage. Some of the larger stages contain as much as 2000 lineal feet of galvanized iron ducts. No particular method of building the ducts is favored, the type of construction depending upon the facilities of the different



This drawing shows a typical expanion chamber muffler. The air coming from the fans must pass through the baffled chamber, where it also expands and loses velocity. In the impact with the walls noise is killed and strained out by the use of felt or other sound-deadening lining of the walls of the chamber



This is another type of sound trap. This looks much like the baffle plates of an air washer. The plates are lined with deadening material. Velocity is killed and sounds extracted in the chamber

sheet metal contractors. Government clips or standing seams, riveted every three inches, are generally used. Although it is not true in all cases, most studios have standardized on the practice of placing all incoming air outlets about 15 feet apart in the walls a few feet from the floor, with the return grilles grouped near the center of the stage roof.

Hair felt blankets are generally wrapped around all exposed sheet metal ducts inside of the stages, especially those under the roofs. This is of some value in deadening sound that enters through the system, but is especially for the purpose of preventing reverberations back into the room from noises created by the playing of a band, shouting, or other sounds necessary in the making of a picture.

What is considered a more approved practice consists of lining the ducts with a half-inch thickness of hair felt. The extent of this treatment depends upon local conditions. In some cases the entire system is lined and in others the elbows and bends are merely padded inside. The hair felt sheets are cut to size and are pasted on the interiors of the ducts as they are made up.

Small fans are customarily used in the exhaust lines for the purpose of drawing the used air out of the stage buildings. Although smaller in size than the feeding fans, these fans are troublesome due to their proximity to the stage interiors. The exhaust ducts are generally completely lined with sound-absorbing material, and if small baffles are not used, the line usually contains several elbows that assist in killing the noise. Such overhead fans are usually mounted on a floating concrete slab resting on a sand cushion.

Sound eliminating methods described above, or methods similar to them, have been found effective in the air conditioning systems in the Fox Hills, Warner Brothers, First National, Metro-Goldwyn-Mayer, and other studios in Hollywood.

Mooseheart Has Four Boys Ready for Apprenticeship

Almost every year we have announced in these columns the number of orphan boys ready to begin their apprenticeship in the sheet metal industry. This year we are advised that four boys have finished their schooling at Mooseheart and are now ready to serve their apprenticeship.

These boys are all approximately eighteen years of age, well developed physically and possessing the best of health. Athletic training, correlated with all other training, has produced clean-cut young men with the ambition to make good in the trade. To the best of our knowledge they have no bad habits. All four of these graduates wish to enter the trade. They are all high school graduates. They all are orphans and will have no home to go to when they graduate, consequently they must secure steady employment at a wage that will permit them to live.

Graduates of this school are not journeyman sheet metal workers, but they have received intensive training that permits them to become first-class mechanics in about two years' time. Past experience has shown that these students have received a type of training that permits them to fit into any contractor's organization and become an asset rather than a burden.

The boys will graduate June 19th, and desire to go to work as soon as possible after that date. They will go to any part of the United States where employment can be assured them.

Any progressive sheet metal contractor desiring to train a first-class mechanic to meet his individual requirements, will be repaid in anticipating his labor requirements to the extent of making a place in his organization for one of these boys.

All students are assigned work that makes necessary the development of skill in the use of tools and machines common to the trade and the acquisition of a practical working knowledge of the materials used. A four-year pattern drafting course is made a part of the training of all sheet metal students. This course is correlated with basic technical information and based upon fundamental principals of construction as applied in architectural sheet metal work.

Every graduate of this department has received at least three months' practical experience on outside work. The student working eight hours per day and the work consists of new and maintainance work on Mooseheart buildings. Furnace work and installation is not stressed in their training.

If you are interested, further information will be furnished upon request.

Address—

J. A. Brandt, Sheet Metal Dept.,
Mooseheart, Ill.

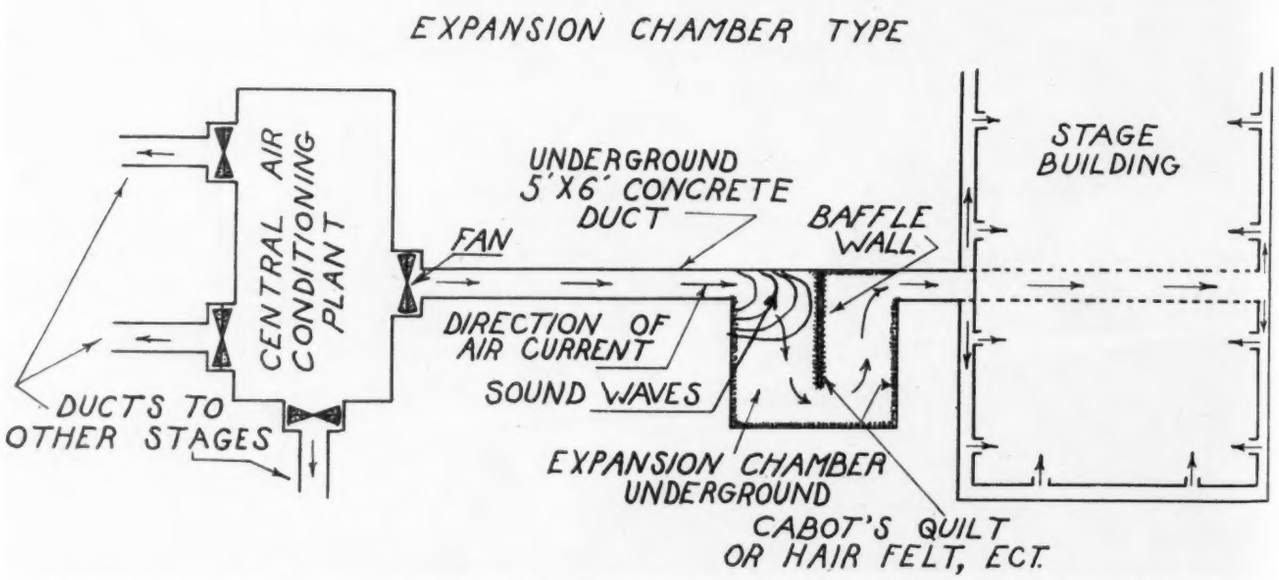
be grouped into two classes—the killing out of sound before the air enters a stage building, and supplementary methods which are used inside of the stage to remove any sounds that may remain or that have originated locally. Either a sound trap or an expansion chamber containing baffles is used as the major sound eliminating device in the air duct outside the building. There are two opposed schools of thought as to where this trap should best be placed. One group holds that in a good installation, the fan should be placed as close to the central heating plant as possible in order that it be away from the stage, and that the sound trap should be as close to the stage as possible so that some noise from the fan will be smoothed out before it reaches the trap and to prevent any local noise leaking into the duct between the trap and the place where it enters the stage. The other group favors placing the baffle immediately in front of the fan so that all fan noises can be killed before reverberations and echoes are set up. No matter in what part of the line the baffling device is located, it is usually a part of the underground system.

At one studio, the trap consists of an underground expansion chamber in the line just outside the stage. The 5x6-foot duct widen out into a room 14 feet square and 9 feet high. Both the entrance and the exit are on the same line at adjoining corners, but free passage is prevented by a single baffle wall extending three-quarters of the way across the chamber. By this means the incoming air is forced to loop around the baffle wall before leaving the chamber. Both sides of the baffle, the walls, ceiling, and floor of the chamber are covered with Cabot's quilt or other soft insulating material. Practically all fan noises are eliminated in this expansion chamber.

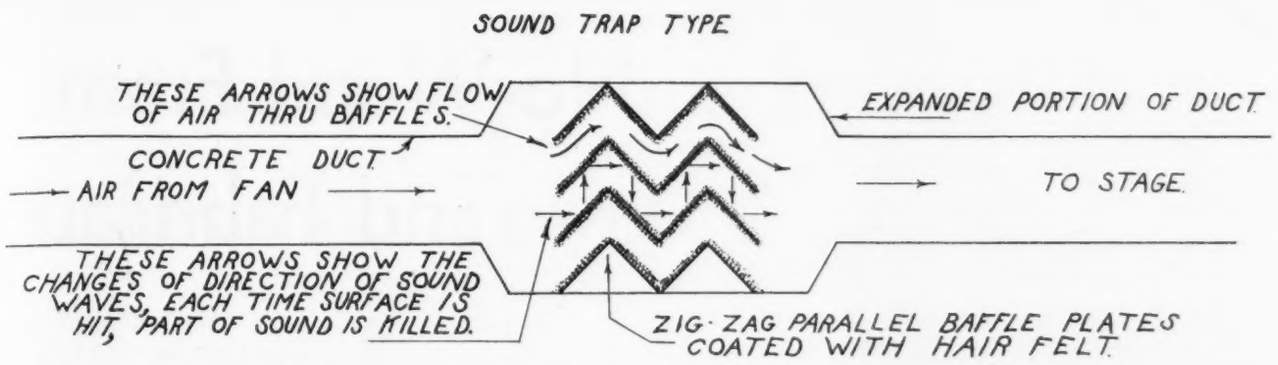
Another type of trap has been developed by H. S. McClelland, heating and ventilating contractor who has made a number of sound stage installations. The device is similar in design to the eliminator in an air washer and consists of several parallel zig-zag baffles that are set up in an expanded portion of the air duct. Each baffle is covered on each side with a one inch thick coat of hair felt. This material was selected after extended comparative tests with other materials. The trap works both on the principal of absorption and reflection. Experiment has shown that for the average size of underground duct, a set of four baffles is more efficient that a smaller or a larger number. There is very little loss of pressure due to friction. Depending upon the velocity of the air, the average trap shows .02 of an inch loss in static pressure on the water column.

At several studios the necessity of using a large external sound trap has been eliminated by a rearrangement of the installation at the central plant. In such cases a gas or steam warm air furnace is used of a type in which the air under treatment passes through a grille of parallel weaving tubes. The furnace is installed in the line on the stage side of the fan, immediately adjacent to it. Whether or not the furnace is in use, the weaving tubes through which the air must pass succeeds in reflecting out a great deal of the fan noise. This arrangement puts pressure on the furnace instead of suction, considered desirable in preventing the leakage of gas fumes into the air supply.

All ducts inside the stage buildings are made up of galvanized iron. The ducts average 60x84 inches in cross section and range from 18 to 24 gage. Some of the larger stages contain as much as 2000 lineal feet of galvanized iron ducts. No particular method of building the ducts is favored, the type of construction depending upon the facilities of the different



This drawing shows a typical expanion chamber muffler. The air coming from the fans must pass through the baffled chamber, where it also expands and loses velocity. In the impact with the walls noise is killed and strained out by the use of felt or other sound-deadening lining of the walls of the chamber



This is another type of sound trap. This looks much like the baffle plates of an air washer. The plates are lined with deadening material. Velocity is killed and sounds extracted in the chamber

sheet metal contractors. Government clips or standing seams, riveted every three inches, are generally used. Although it is not true in all cases, most studios have standardized on the practice of placing all incoming air outlets about 15 feet apart in the walls a few feet from the floor, with the return grilles grouped near the center of the stage roof.

Hair felt blankets are generally wrapped around all exposed sheet metal ducts inside of the stages, especially those under the roofs. This is of some value in deadening sound that enters through the system, but is especially for the purpose of preventing reverberations back into the room from noises created by the playing of a band, shouting, or other sounds necessary in the making of a picture.

What is considered a more approved practice consists of lining the ducts with a half-inch thickness of hair felt. The extent of this treatment depends upon local conditions. In some cases the entire system is lined and in others the elbows and bends are merely padded inside. The hair felt sheets are cut to size and are pasted on the interiors of the ducts as they are made up.

Small fans are customarily used in the exhaust lines for the purpose of drawing the used air out of the stage buildings. Although smaller in size than the feeding fans, these fans are troublesome due to their proximity to the stage interiors. The exhaust ducts are generally completely lined with sound-absorbing material, and if small baffles are not used, the line usually contains several elbows that assist in killing the noise. Such overhead fans are usually mounted on a floating concrete slab resting on a sand cushion.

Sound eliminating methods described above, or methods similar to them, have been found effective in the air conditioning systems in the Fox Hills, Warner Brothers, First National, Metro-Goldwyn-Mayer, and other studios in Hollywood.

Mooseheart Has Four Boys Ready for Apprenticeship

Almost every year we have announced in these columns the number of orphan boys ready to begin their apprenticeship in the sheet metal industry. This year we are advised that four boys have finished their schooling at Mooseheart and are now ready to serve their apprenticeship.

These boys are all approximately eighteen years of age, well developed physically and possessing the best of health. Athletic training, correlated with all other training, has produced clean-cut young men with the ambition to make good in the trade. To the best of our knowledge they have no bad habits. All four of these graduates wish to enter the trade. They are all high school graduates. They all are orphans and will have no home to go to when they graduate, consequently they must secure steady employment at a wage that will permit them to live.

Graduates of this school are not journeyman sheet metal workers, but they have received intensive training that permits them to become first-class mechanics in about two years' time. Past experience has shown that these students have received a type of training that permits them to fit into any contractor's organization and become an asset rather than a burden.

The boys will graduate June 19th, and desire to go to work as soon as possible after that date. They will go to any part of the United States where employment can be assured them.

Any progressive sheet metal contractor desiring to train a first-class mechanic to meet his individual requirements, will be repaid in anticipating his labor requirements to the extent of making a place in his organization for one of these boys.

All students are assigned work that makes necessary the development of skill in the use of tools and machines common to the trade and the acquisition of a practical working knowledge of the materials used. A four-year pattern drafting course is made a part of the training of all sheet metal students. This course is correlated with basic technical information and based upon fundamental principals of construction as applied in architectural sheet metal work.

Every graduate of this department has received at least three months' practical experience on outside work. The student working eight hours per day and the work consists of new and maintainance work on Mooseheart buildings. Furnace work and installation is not stressed in their training.

If you are interested, further information will be furnished upon request.

Address—

J. A. Brandt, Sheet Metal Dept.,
Mooseheart, Ill.

No-Wood Framing and Fabrication

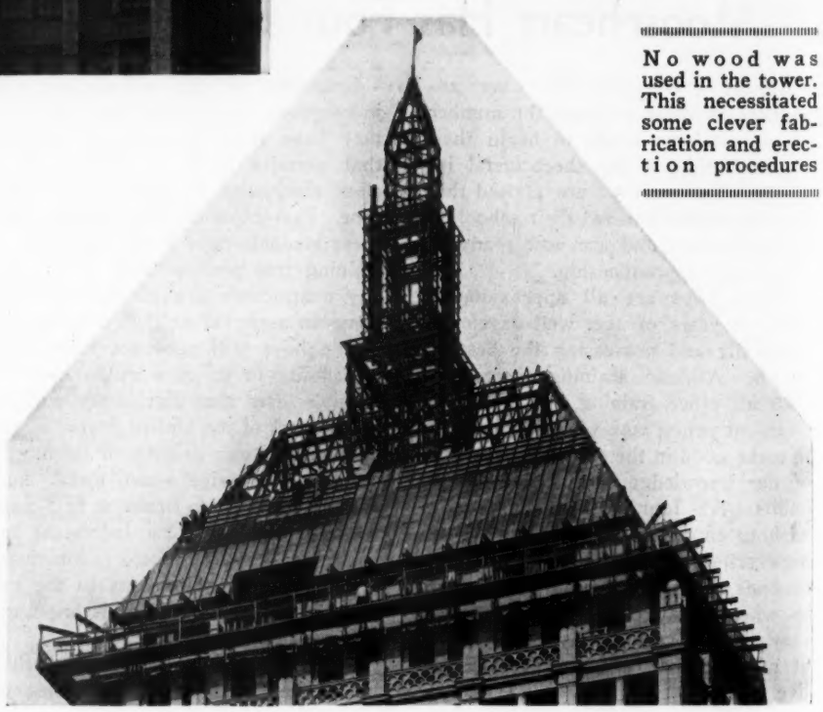
The aluminum sheathed roof and tower constitute one of the distinguishing landmarks of the Rochester, N. Y., skyline.

THERE was completed late last year in Rochester, N. Y., in connection with the enlargement of the office building of the Eastman Kodak Company, an aluminum contract entailing some very unusual features of fabrication, erection and handling of materials.

Additional floors, arranged setback style, were added to the building and an ornamented tower, to be flood lighted at night, was designed to make the enlarged building one of the distinguishing features of the city.

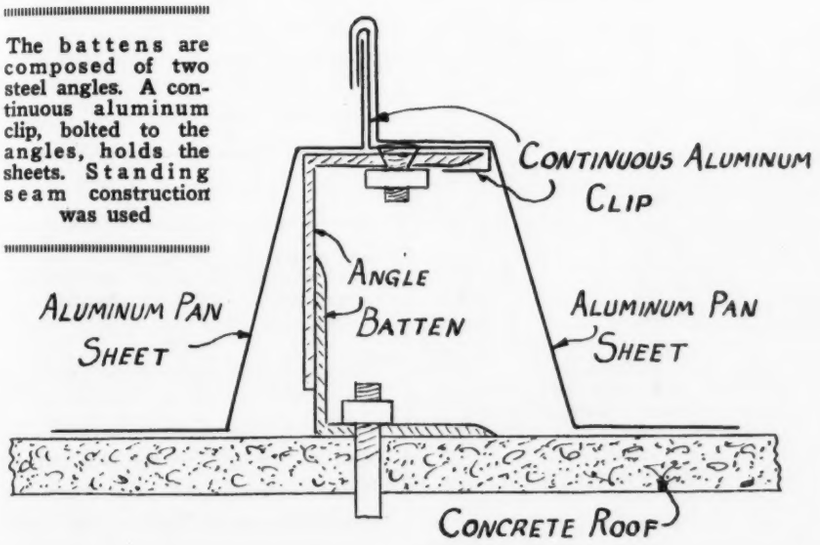
The architects for the remodeling is the firm of Gordon and Kaelber of Rochester. The sheet metal contractor who fabricated and erected the metal work is the William J. Meyer Company, one of the largest contracting firms in western New York state. This company maintains an excellent shop and in addition to sheet metal work does an extensive business in built-up and prepared roofing. The company has a shop on a private siding where carloads of roofing materials can be unloaded into the store house of the shop.

William J. Meyer is a firm believer in the use of good equipment. Power presses, shears and brakes are used. The company does considerable welding work and uses both electric and gas welding equipment. In connection with this proposition of welding, Mr. Meyer states that since welding is coming into wide use he has one man who is an expert. Just as quickly as any new welding information is avail-



No wood was used in the tower. This necessitated some clever fabrication and erection procedures

Necessitates Ingenious Erection On Eastman Tower



The battens are composed of two steel angles. A continuous aluminum clip, bolted to the angles, holds the sheets. Standing seam construction was used

able this operator is sent to the welding equipment factory to learn all about it. Much of the success of this job, where considerable welding had to be done, was due to this familiarity with welding processes.

In planning the addition, a number of designs showing various types of towers were considered. The design selected consists of a high peaked roof surmounted by a peaked observation tower, the whole tower sheathed in aluminum.

One of the interesting and unusual features of this roof and tower is the fact that no wood was permitted in any part of the tower. The roof consists of a steel framing of beams and angles with the angles bolted horizontally across the beams. On top of the horizontal angles a precast concrete slab was laid. This was covered with a waterproof paper to keep the aluminum sheets from direct contact with the concrete.

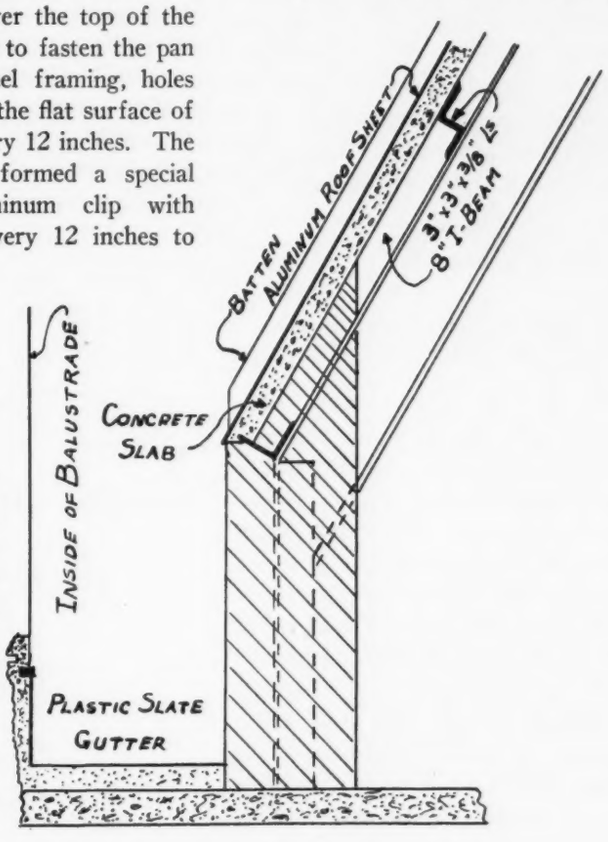
This roof is of the batten type, but an unusual form of batten was used. The battens consist of two structural iron angles bolted together as shown in one of the details and in turn bolted through the concrete slab to the iron beams.

The formation of the sheets is standing seam over the top of the batten. In order to fasten the pan sheets to the steel framing, holes were punched in the flat surface of the top angle every 12 inches. The contractor then formed a special continuous aluminum clip with holes punched every 12 inches to correspond with those in the angle.

The pan sheet to the left of the batten was then placed and the continuous clip slipped over the standing edge and bolted with ⅜-inch bolts with the nuts below. The pan sheet to the right of the batten was then hooked over the other pan sheet edge and the clip and the three pieces then pounded tight into the standing seam.

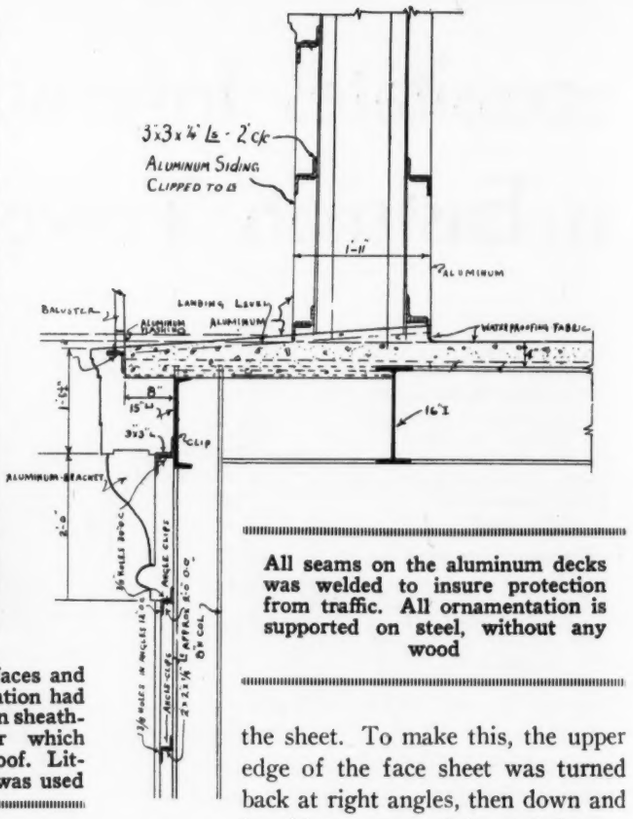
It can be seen that this type of construction makes liberal provision for expansion of the pan sheet. In forming the pan sheet, however, the outside fold was made just short of the vertical so that the standing faces are not true vertical, but slightly sloped.

Because of the steep pitch of the roof, plain flat locks were used on



I-beam girders with angle iron purlins covered with concrete support the metal roof. Protective measures consist of waterproofing fabric under the aluminum. This cross section shows the construction

Detail of Roof Construction



All seams on the aluminum decks was welded to insure protection from traffic. All ornamentation is supported on steel, without any wood

Both plain surfaces and intricate fabrication had to be followed in sheathing the tower which straddles the roof. Little scaffolding was used

the horizontal seams. This eliminated the necessity for welding all such seams. Due to the proportion of height to width of the two end sections of the roof, no one panel of roofing is completely rectangular, but each panel ends on a sheet cut to fit the angle of the hip to the battens.

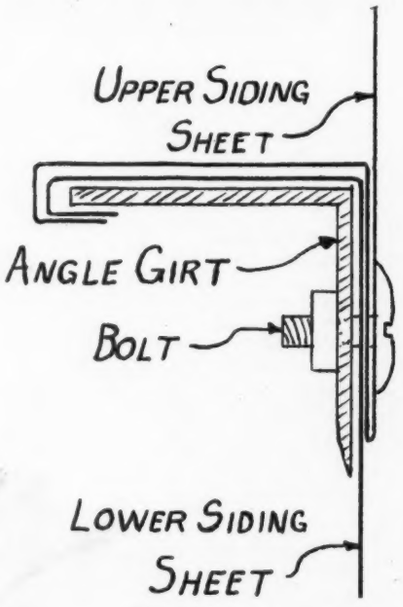
At the hips a different type of construction was used. Special pan sheets were formed in the shop having a recessed pocket. These sheets were secured to the concrete and to the other pan sheets. This sheet was cut and turned up and back

This cross section shows the metal fabrication at the hips

and had all corners welded. The sheet was slipped into the recess and the hip was completed with a cap snapped in place. This cap had pocket joints to provide for expansion and contraction.

The observation tower straddles the ridge of the main roof. This tower is 16 feet square and consists of plain vertical faces below an aluminum cornice and walking balcony. The framework of this tower has four I-beam corner columns with vertical angles tied together with horizontal angles and braced with diagonal angles. Angles running horizontally across the faces of the tower wall are used to support the aluminum siding sheets.

Just as unusual a type of fabrication and erection was used for the horizontal joints of the vertical sides of the tower. The angle bracing was punched at 12-inch centers as on the roof. The general construction might be described as recessed pockets behind the face of the sheet. To make this, the upper edge of the face sheet was turned back at right angles, then down and in with two more right angled turns to form a pocket around the back edge of the angle. The lower edge of the face sheet was round turned back behind the face of the sheet, then back at right angles and down and in with two more right angles. The three vertical faces were then held by a ⅜-inch bolt passed through and locked. One of the details shows this construction.

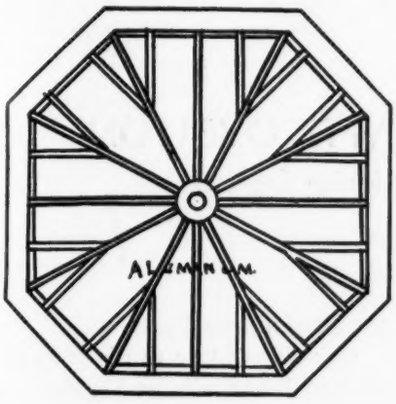


Horizontal joints on the tower were formed like this. No wood was used

The vertical joints were formed to make a standing, strengthening seam with the standing seam on the inside of the sheets. The formed seam was bolted through at intervals to keep the joint tight. One of the details shows how this construction was worked out.

Construction at vertical joints in siding

These vertical faces are surmounted by the open balcony. This balcony is supported on I-beams covered with a heavy concrete slab. The platform projects out over the face of the tower walls and is ornamented below the deck with an aluminum cornice. One of the de-



PLAN-D-D

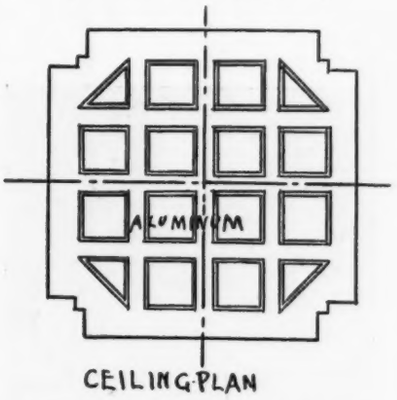
tails shows a cross section of this ornamentation. The brackets used are formed aluminum. The plain panel face above the brackets is also aluminum assembled as flat sheets locked end to end around the tower.

The deck which covers the concrete slab is crimped aluminum fabricated as standing seams. All the ends of seams on this deck were welded to prevent any opening of seams due to traffic on the deck. The outside of the deck is protected by an aluminum railing.

One of the plan details shows the tower at this deck level. It can be seen that the walls of the tower which rises above the deck are all solid excepting one which is left open to provide an entrance and exit for persons wishing to walk around the balcony.

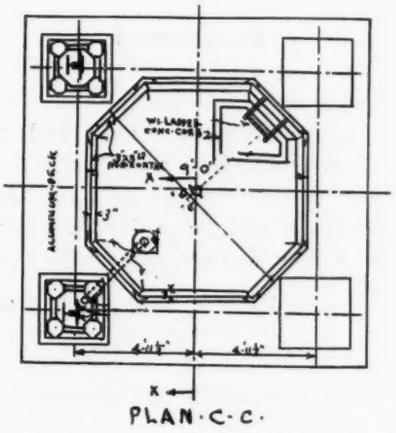
The faces of the tower walls above the deck consist of fluted corner columns framing a round column and arch panel for ornamentation. The supporting framework for this section consists of I-beam columns at the corner and

(Continued on page 26)

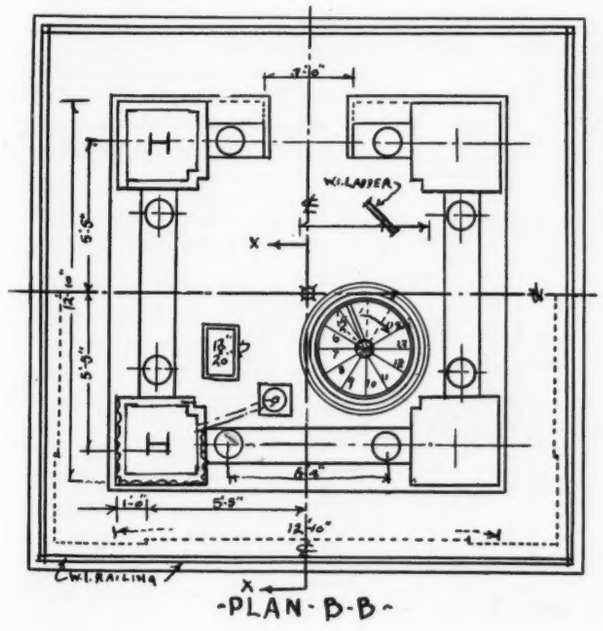


CEILING PLAN

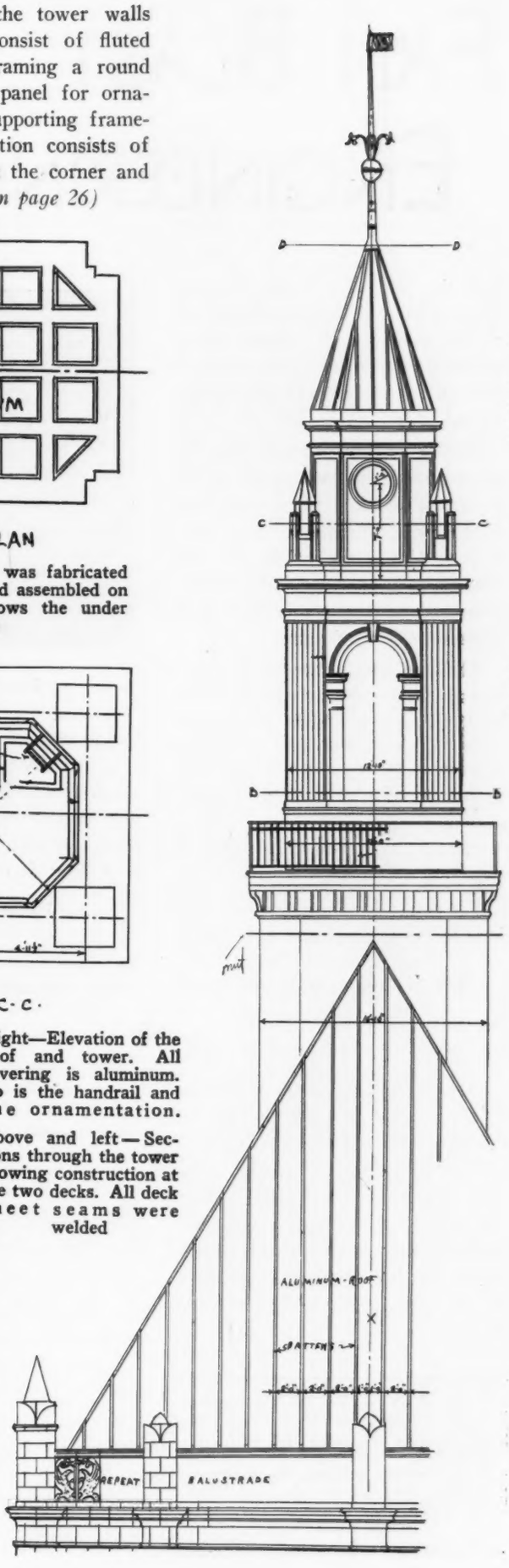
The tower ceiling was fabricated in four sections and assembled on the job. This shows the under side



PLAN-C-C



-PLAN-B-B-



Right—Elevation of the roof and tower. All covering is aluminum. So is the handrail and the ornamentation.

Above and left—Sections through the tower showing construction at the two decks. All deck sheet seams were welded

FAN BLAST ENGINEERING

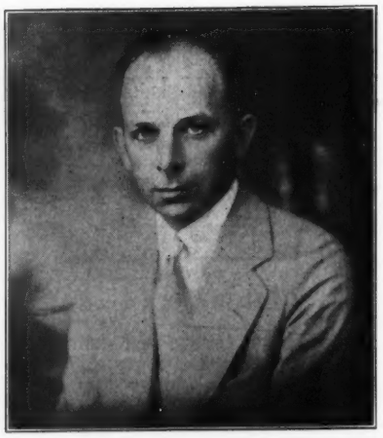
By PLATTE OVERTON
Heating Engineer

IN the May 25th issue we completed our design and layout of the supply and exhaust flues. We will now turn our attention to the furnace room and the equipment.

Before we can proceed with the selection of the heaters we must know the required grate area. Before we can estimate the grate area we must know the amount of fuel we will burn per hour and we must also assume the combustion rate per square foot of grate.

The combustion rate for installations of this type may vary from 10 to 13 pounds per hour per square foot of grate and we will pick 12 as the average. For the installation under discussion, we will assume that they will burn soft coal with a B.t.u. value of 12,000 per pound of dry fuel.

We determine the pounds of coal burned per hour from the formula.



Platte Overton

$$\frac{\text{Total c.f.m.} \times .60 \times .069 \times 0.24 \times \text{temp. rise outside to final temp.}}{7200}$$

Where—

60 = minutes in one hour, as our c.f.m. is cubic feet per minute and our combustion rate is per hour.

.069 is the weight of one cubic foot of air at 115 degrees, our average for the 16,639 c.f.m. We multiply by this factor to change our cubic feet to pounds of air as a B.t.u. is based on pounds, not cubic feet.

0.24 = specific heat of air. Our loss is based on B.t.u.'s and a B.t.u. is based on water or is the heat energy required to raise one pound of water one degree. Now 0.24 B.t.u. is required to raise one pound of air one degree.

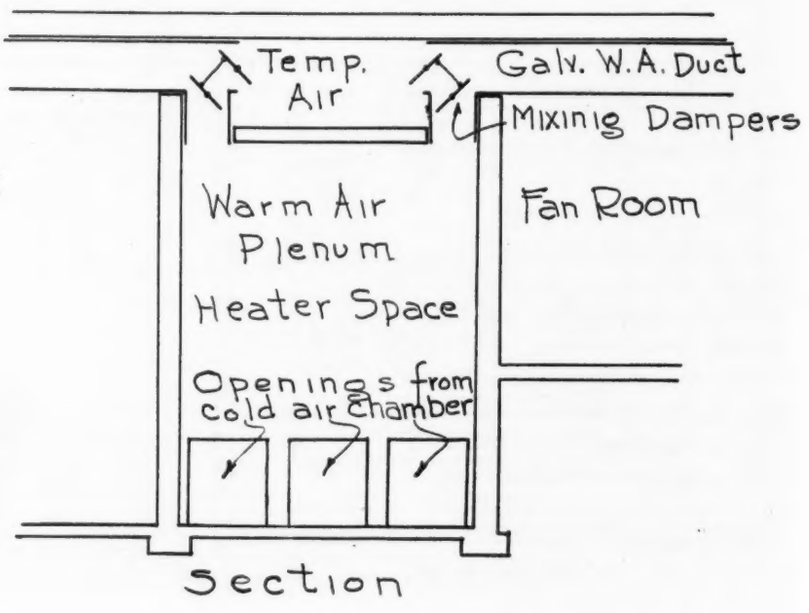
Our temperature rise is from 20 degrees below zero to 115 degrees final temperature or 135.

At this time we will point out that the temperature in the warm air plenum may be 125 to 135 degrees and the loss in the flues and ducts to the grille will absorb this difference in temperature, hence it will be seen that the temperature rise should be —20 degrees to 135. The writer contends that any loss inside the building is not truly a loss, as it is given up to the building. For our problem the loss will be disregarded.

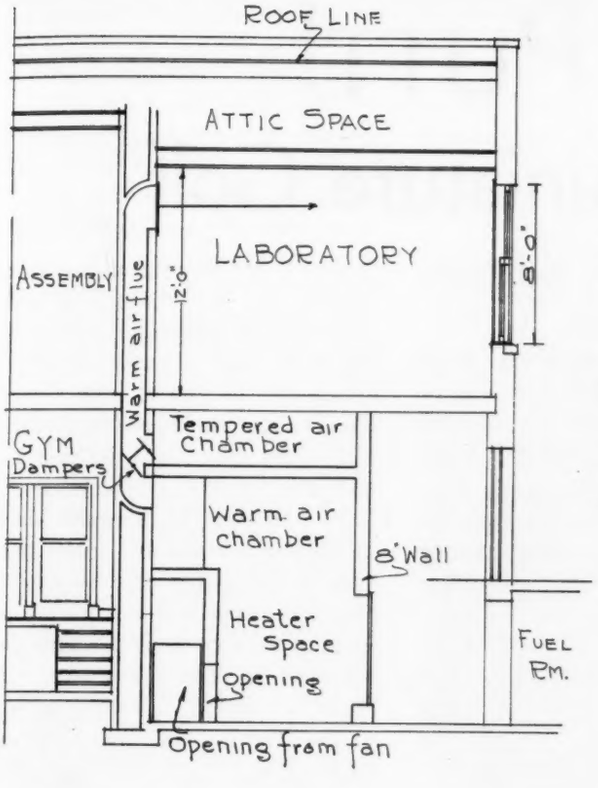
7,200 is the available B.t.u. in one pound of 12,000 B.t.u. coal at a heater efficiency of 60 per cent, or 60 per cent of 12,000 equals 7,200, hence our pounds of coal per hour becomes—

$$\frac{16639 \times 60 \times .069 \times 0.24 \times 135}{7200} = 247.9 \text{ pounds of coal}$$

Our grate surface is pounds of coal per hour divided by the com-



This cross section of the heater room shows the location of the three openings from the cold air chamber. The warm air plenum is above the heaters. At the top is the tempered air plenum. The fan room floor is higher than the heater room floor.



This cross-section shows the fan location and the location of the mixing dampers at the entrance to the flue to the laboratory. As the damper swings, warmer or cooler air is admitted to the flue. This damper is controlled by the individual room thermostat. Air is blown into the laboratory continuously.

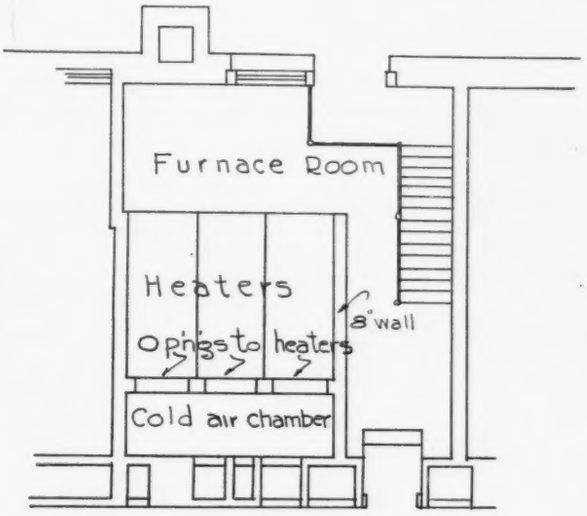
bustion rate or 247.9 divided by 12 equals 20.65 square feet of grate. From this we choose 3 heaters with a grate surface of 7 square feet each.

On the plan of the heater room is shown the arrangement of the three heaters. As shown on the cross section, it will be noted that the floor level of the fan room is higher than the floor level of the furnace room. In this cross section it will be noted that there are three chambers, a warm air plenum, a tempered air plenum and in the rear of the heaters a cold air chamber with an opening from the fan and an opening to the rear of the heaters through which the air is supplied to the heating units.

From the chamber in the rear, a by-pass flue passes up to the tempered air plenum. This flue has an opening from the warm air plenum.

We should now consider the size of the smoke flue. For the type of furnace under consideration we may use the formula

$$H = \frac{(.85 \times A)^2}{S^2}$$



This plan of the heater room shows the location of the heaters, the cold air room and the openings between these two.

or

$$S = .85 \times \frac{A}{\sqrt{H}}$$

Where

H = Height of flue above grate.

S = Area of flue in square feet.

A = Area of grate in square feet.

As H, the height, is known (50 feet), we will use the second formula, and our problem becomes: Flue area in square feet equals .85 times (21 divided by the square root of 50), or $.85 \times \frac{21}{7.07+} = 2.52$ square feet of flue area.

Our flue must be 13x13 or 17x17 or 21x21 to conform with standard brick measure. As 17x17 would be less than 3 square feet, we will pick the 21x21 inches as our measure, hence we have a smoke flue 21x21 inches, 50 feet high.

If our area is known and our height the unknown factor we use the first formula and we have .85 × 21 squared divided by 2.52 squared equals 318.30 divided by 6.35 equals 50 feet for our height.

The above formulas will vary for different sections of the country. The flue size and height as given above would not apply for a building in Denver, Colo., or New Orleans, La. The above formula would not apply to down draft boilers, and is for horizontal cast iron furnaces only. The factor .85 should be changed to .80 for round pot top radiator furnaces or to .90 to .95 for furnaces that require more than .15 draft in inches of water for a 12-pound combustion rate.

If in doubt the manufacturer of the furnace in question should be consulted. Remember that the proper smoke flue is highly important. Also bear in mind that a smoke flue can be too large as well as too small. Be sure you are right.

PUTT–PUTT!

Cash in on Miniature Golf

By **GEORGE N. KRAMER**

IN miniature golf, it's the hazards, and during these days of the putt-putt craze, the same thing applies in a way to the sheet metal worker. At least, there is one firm in Los Angeles, The Plumbing Sheet Metal Products Co., that has been cashing in on what has come to be almost a national sport. They make hazards to order and have found a ready sale for this type of installation, because it is both different and substantial.

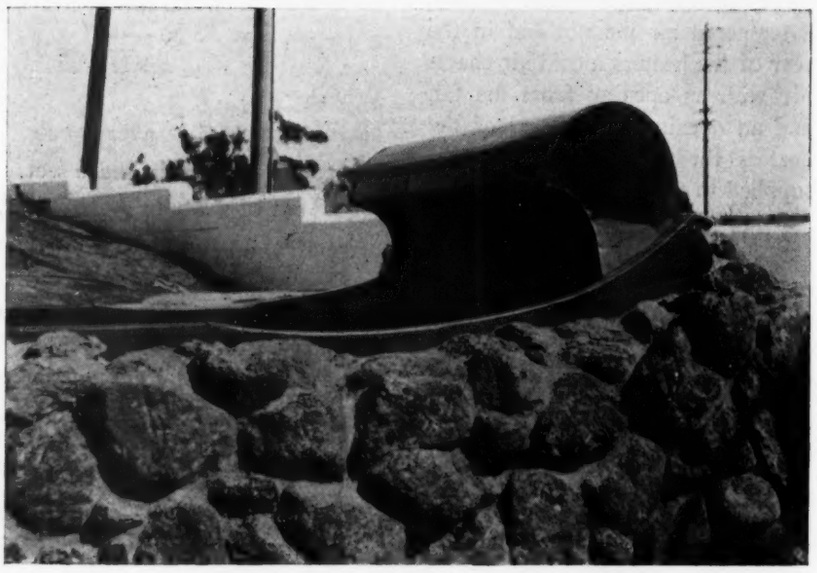
But for the contractor who finds time heavy on his hands, it is open season all of the time for soliciting business on the pee-wee golf links.

The tendency has recently been for each course to have a motif or central theme in the construction or landscaping of the grounds and in line with this the hazards were made to conform. The public has become bored with the monotony of putting the ball through a little opening in an upright board or driving it through a series of stakes driven into the ground. They want novelty, and the opportunities afforded the sheet metal designer are unlimited. It is not difficult for the firms who go in for specialty work to suggest patterns and tricky hazards to the golf course owner; in fact, the owner will have plenty of ideas of his own if given a little encouragement and assistance. A variety of hazards will dress up any of the greens, make them more interesting and attract more business; and when it can be shown that they will pay for themselves in fees, such items will not be difficult to sell.

Selling does not require a great amount of time to solicit orders because the owners are as a rule easily reached and always open to suggestions for improving their places.

Above—Here is a little building hazard any sheet metal shop can put together in a few minutes. It takes its form from a local airplane hanger.

It must be understood that no sheet metal contractor could base his business on miniature golf courses alone, but there is every reason that custom-made hazards might be made a profitable sideline. While many golf course owners move under cover or indoors during winter, it is generally predicted that miniature golf is here to stay for some time and that it will blossom out again in the open at the first chirp of the robin each spring.



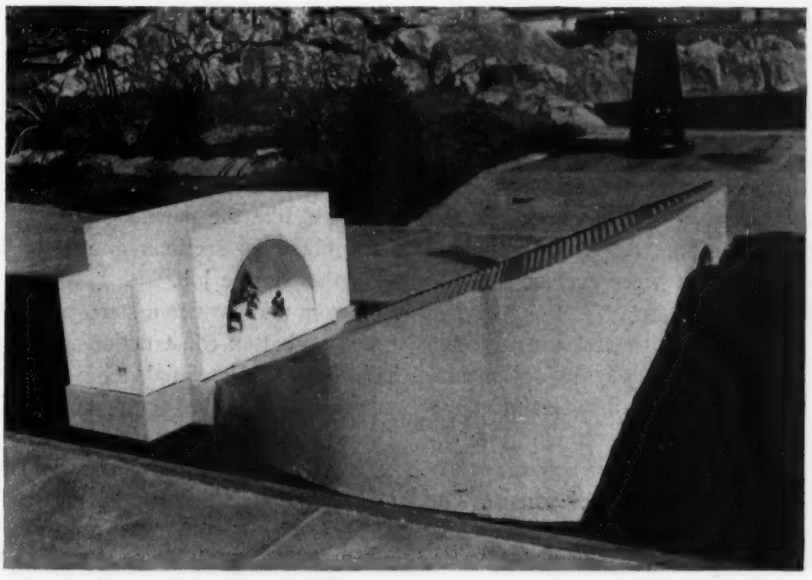
Below—And here is another that ought to make any player sit up and take notice. It's all metal and represents a nice profit.

While any particular course will not yield a fortune in business, still it is surprising how much material and work can be applied on eighteen greens, from the tee to the cup itself. It is advisable first to size up the grounds in order to formulate some definite ideas as to what would be the most suitable, but the needs on every one are about the same. The only difference might be in designs and novel creations which would make any individual course stand out as distinctive from the rest. However, a certain number of stock models might be drawn up which would be acceptable to several and these could be built more cheaply than where each item is made to order. It is also a good plan to have drawings or photos to serve as models and suggestions when calling for business.

Sheet metal hazards and other similar features have many advantages over any other kind. They may be painted attractively; they can be made into any required shape and size; they are substantial; they blend in excellently with the general theme, and they possess a novelty and finish rarely found in those made of other materials. In fact, sheet metal is the logical thing for use on the miniature golf course. Besides all this, the cost is less for value received.

There remains the question of price. According to the contractor just referred to, the price of any custom-made article should be figured on a time and material basis. Except in rare cases, it is not difficult to estimate the time required to cut and assemble materials, although the estimator must be careful not to under-rate the working time element, for it is surprising at times to know how long detail work will take. For this reason, it is best to steer clear of too much detail and keep to broad outlines as much as possible. Materials really constitute the smallest item, for the average hazard is not large. To the labor and materials cost should be added a substantial margin of profit, especially where delivery and possibly the complete installation of the article is required.

These oil derricks and tanks form the hazard on this hole. Again all sheet metal and unusual because they were designed around a well known local situation.

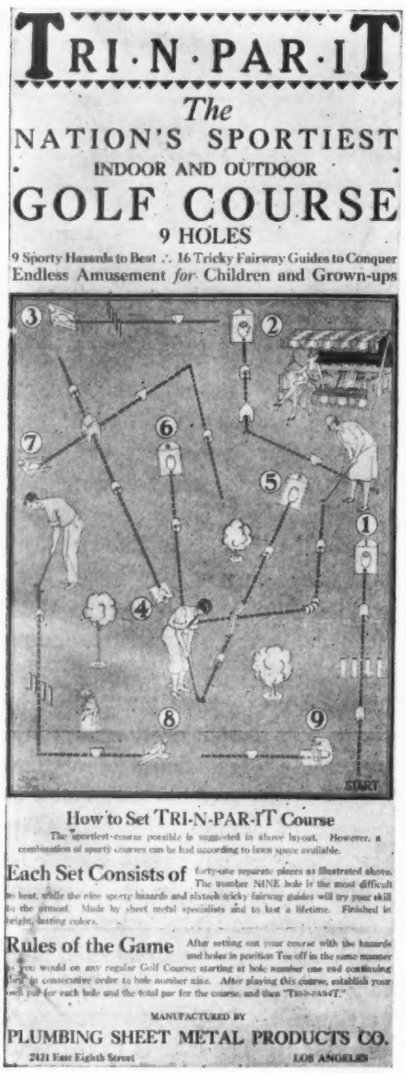


Any putt-putt golfer would like to put the ball through this hazard. It's all metal, including the curved and banked approach.

While it has been the experience of the Los Angeles firm that business of this kind is not difficult to get, it is pointed out that care must be exercised in extending credit. While it is generally thought that the miniature golf craze will settle down as a recognized pastime and that players will continue to patronize the courses, it is likewise certain that many of the lesser ones will be compelled to drop out. With the construction of grounds running up to the hundred thousand dollar mark, the early ones must either be completely remodeled or cease to do business. One course in Los Angeles was recently completed at a cost of almost $150,000. For these reasons, no credit should be extended to the courses that are doomed to fail and even on the larger ones, a substantial cash payment and preferably all cash should be the rule. As this contractor expressed it, "The idea is to get your money, and the owner of a good golf course is in a position to pay

you. It's the many uncertain ones you have to watch out for."

The Plumbing company has a golf course specialist; that is, a man who devotes his entire time to this specialty. The firm not only makes made-to-order or custom pieces of any sort whatsoever, along the lines of such items as pictured, but also makes the stands where the players write their scores, markers, par signs, and what-nots. In addition to this, they have developed home sets or backyard hazards which they are turning out in stock models in volume. These are jobbed through local stores and there is a big demand; in fact, three men are kept on the night shift at present and have been for some time, trying to supply the demand.



This is the mailing broadside used by the company.

A recent estimate by the U. S. Department of Commerce is that miniature golf has produced upwards of $228,000,000 worth of business for supply firms and labor. Since a great number of courses have already paid for themselves, it means that the money turnover during the past year has been near a half billion dollars, which makes miniature golf not only a pastime but an economic factor as well. It has made its influence felt in every section of the country and while it will not continue as a craze, it will remain for some time a game of some standing with the public demanding more and snappier hazards. To what extent the sheet metal contractor has cashed in or will make the most of the game depends upon himself. According to one who has tried it successfully, the opportunities are there for those who care to pick up a little extra business at a profit.

Aluminum Work on Eastman Tower

(Continued from page 21)

roof beams above supporting another concrete deck. The corner, fluted columns are square excepting for a small cut-out on the inside corner. The aluminum columns are supported top and bottom by welding in cross braces and bolted through to plates in the steel frame. These fluted corner columns were assembled as complete units in the shop and placed as units in the tower.

The ornamental panel between these columns was also fabricated as round columns for one section and a flat back wall as a second section. Above the columns is an arched panel which was fabricated as a section. All the seams for these panels were welded on the job.

An interesting feature of this observation tower is the ornamental ceiling. One of the details shows the design of this ceiling. The design uses depressed square panels with triangular corner panels. The ceiling was fabricated as four sections with the seams turned back and riveted together on the job. The complete ceiling was then put in place and fastened to the structural frame from behind.

Above the arched portion of the tower there is another cornice and deck which supports corner ornamental aluminum lanterns. This cornice is plain faced and is of aluminum. Above this cornice there is another aluminum deck, welded again for protection. The lanterns are of quite ornate design, as shown in one of the details.

Inside the lantern area there is an octagonal vertical section again consisting of paneled faces with a flat back surface. The frame for this section of the tower is identical with that of the section below—angles on vertical I-beams and vertical angles. The sections of aluminum were again supported as in the section below. The detail of this section will give a good idea of how the sections were fabricated.

These panels are surmounted by another cornice, again of plain design and small projection. The cornice, like the panels below, was assembled as sections and welded together on the job.

From this cornice a steep-pitched roof of batten construction rises to the base of the finial. One of the details shows the arrangement of this proof. The battens shown indicate another use of the double angle battens. The supporting roof here is also steel pans. These pans were made of heavy sheet iron and fastened to the frame. The pans were then insulated and the aluminum placed over the insulation.

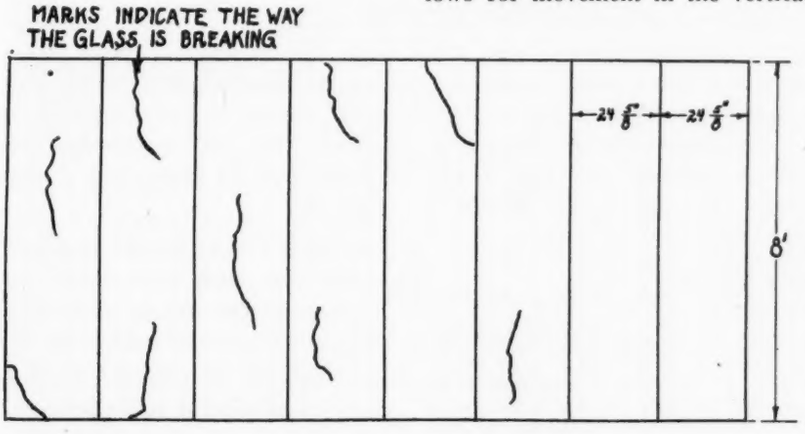
The aluminum finial was designed and assembled from designs of the architect.

This tower is flood lighted at night. The soft color of the aluminum under the special lights is a striking addition to the Rochester skyline.

Here's Some Solutions to That April 27 Skylight Trouble

IN the April 27th issue we published a small sketch showing glass breaks in a reader's skylight job. We invited readers who had experienced any similar difficulty to tell us what caused these cracks and what could be done to remedy the situation.

The trouble was explained thus: These skylights are eight feet by sixteen feet four inches with eight glass two feet wide by eight feet long. These frames are of copper with plenty of space between the bars to take care of expansion and contraction but the glass are breaking on the average of one a day. These are one-quarter inch wire glass set in putty. Does anyone think that this is faulty glass or



This sketch shows how the panes of glass are breaking. Breaking has been continuous

what is the fault. Above is a sketch of skylight and the way the glass is breaking.

In answer to this problem, answers were received from several parts of the country. Here is one from W. A. Fingles, Inc., of Baltimore, Maryland. H. W. Harris of "Bill" Fingles' company says:

"We would suggest that Mr. Stocker remove all of the present glass from the skylights, remove all the putty, cut the remaining good glass in lengths of 48 inches each, install a substantial cross bar, reset the glass in red elastic roofing cement, and his troubles will be all over.

"We would also suggest that Mr. Stocker pay particular attention to the caps on these skylights to see that they do not bear too hard upon the surface of the glass.

"The trouble in question is caused by the glass being set in putty which, as he no doubt knows, forms like a hard cement after a period of several weeks and does not allow for any expansion and contraction that may have been allowed for between the bars. Our reason for cutting the glass in 48 inch lengths instead of 96 inch, allows for movement in the vertical direction, just as the elastic cement allows for movement in the horizontal direction.

"We hope that the above information will be of some service to Mr. Stocker, and that we may have the pleasure of knowing the outcome of this problem."

And from the Thomas Sheet Metal Company, Lewistown, Pa., C. A. Thomas writes:

"Mr. Stocker's trouble may come from an atmospheric temperature condition. The writer is not a skylight expert, but remembers being told quite a long time ago by a representative of a glass manufacturing concern that a heat producing instrument such as radiation, a steam or hot water line or anything else that might produce heat —if situated underneath or within close proximity of a skylight—will cause excessive glass breakage.

"We have not had any experience with the above conditions, but have remedied conditions where ridge bars on several large double pitch skylights started to sag and caused an undue amount of breakage."

Then from way down in the Southwest where expansion IS expansion, K. G. Lundin, who says he has been making skylights for 30 years, writes:

"In regards to E. C. Stocker's skylight trouble in your April 27th issue, I want to say that the cause of glass breaking is the lights are too wide and too long.

"If the copper bars are rigid enough and made with a 3/16" x 2½" flat bar painted core, then the trouble can be eliminated by inserting cross bars and cutting the lights in two.

"Some California cities have included skylights in their building ordinances to prevent skylight glass from breaking and falling. Ordinance reads as follows: 'Skylights to be made of not less than 24 gauge galvanized iron, all joints to be riveted or bolted, glass to be ¼-inch wire glass not over 16 inches wide.'

"If we use too long a glass pane then the building inspector makes us put in an angle iron or T bar crossways in center for support of bars."

It isn't too late yet to send your suggestions along.

A. W. Dudley Co. Solves "Tricky" Garage Problem by a GRAVITY OVERHEAD SYSTEM

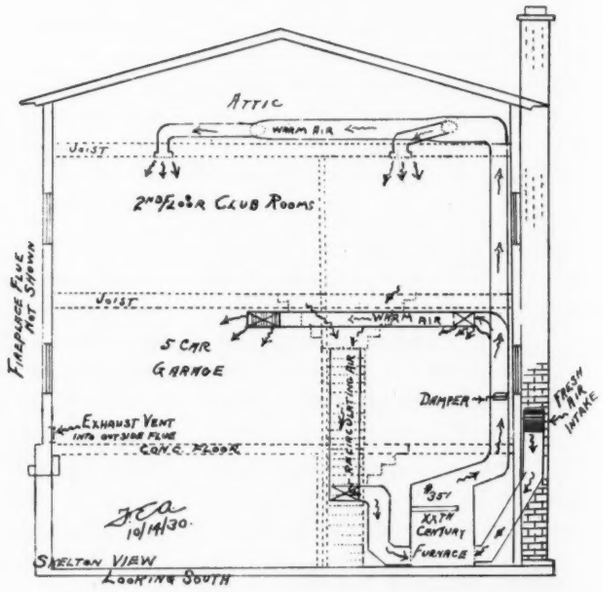
ONE of the things which makes this warm air heating business interesting is the "unusual" job which turns up now and then to cause the contractor to take the job home, lock himself up in a quiet room and forget all about Amos and Andy and the movies until he has worked out every detail. And though that one job may demand more hours of thought and planning than the profit warrants, there is a sense of satisfaction which puts mere thought of profit out of the picture.

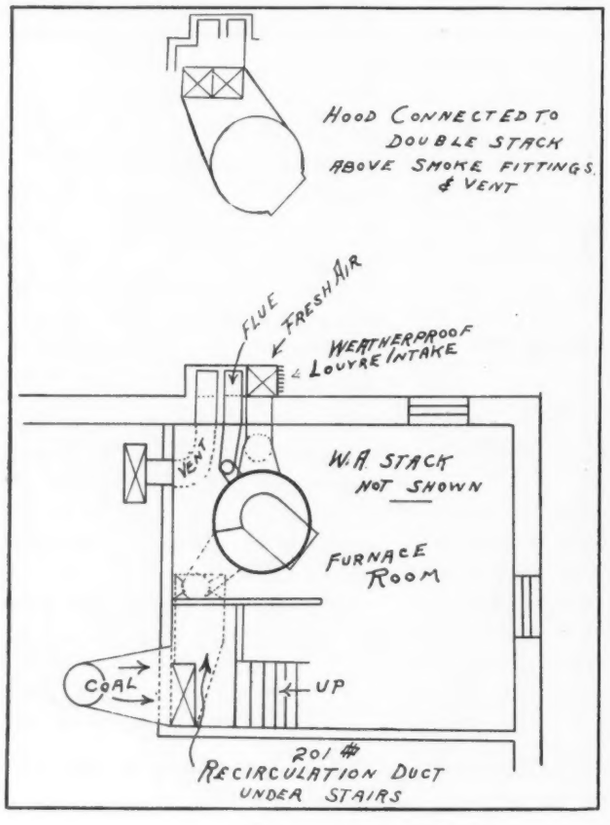
It is these jobs which keep contractors interested in their work. They are, in every sense, engineering problems demanding the best of knowledge and experience the contractor possesses. And when they are all installed and tested some cold night when everything is against them and work—that's another of those grand and glorious feelings.

And it should be said in all sincerity that such jobs designed to handle air, demand far more practical and theoretical knowledge than any system consisting of some lengths of pipe, a few elbows and T's, and a radiator placed here and there around the floor.

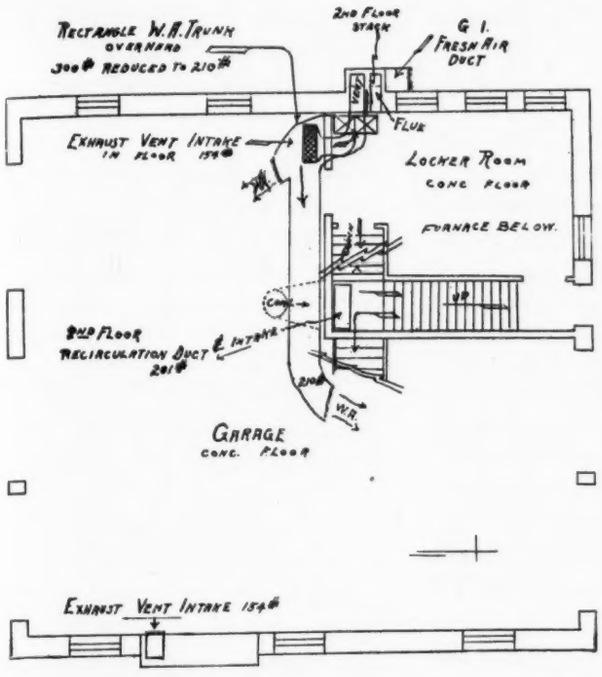
The drawings which accompany this article show the features of one such installation. It is the kind of a job which every contractor likes to take home and worry about. This particular job was designed and installed by the A. W. Dudley Company of Terre Haute, Indiana. The man responsible for the design and installation is Frank E. Anderson, past president of the Indiana Warm Air Heating Contractors' Association and one of the best known heating men in his state.

An overhead, gravity system was chosen in order to simplify the layout and reduce the labor cost necessitated by the concrete floor and the peculiar interior atmospheric conditions. Here is how the system looks in cross section. Note the outside air duct, the wind dampers and the second floor reciculator.





Two trunks were necessary — one for each floor. The top drawing shows how these two trunks were taken off the bonnet. The lower sketch shows how the outside air is brought to the furnace. Note here also the offset recirculator which comes down the stair well and across the floor at a low pitch to the casing. Coal supply is chuted from the garage floor above



This is the garage floor. Note the two exhaust vents — one on each side of the floor. The lower right corner of the plan is north. One warm air inlet pointed toward the cold corner delivers two thirds of the duct volume to this corner. Infiltration and exterior pressure distribute this air. The larger, but warmer, two thirds of the garage is heated by one inlet delivering one third of the duct volume

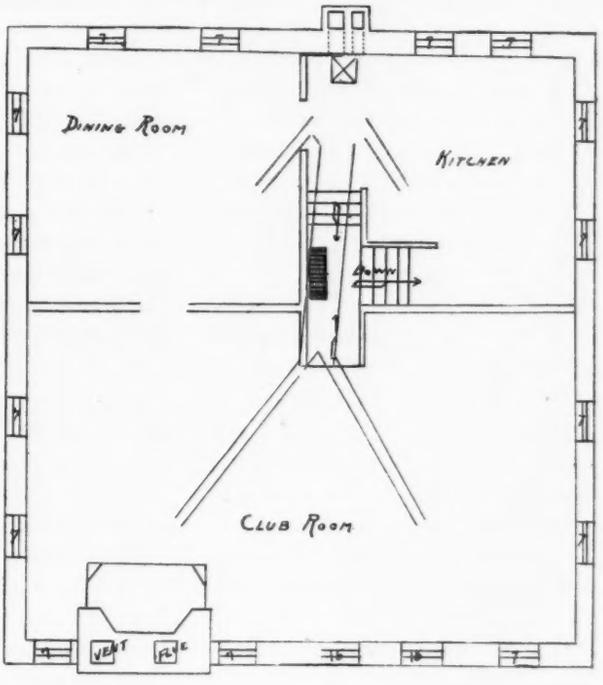
Several problems of vital importance had to be worked out before this system could be installed. The building has three floors and an attic and is used as a combination garage and owner club room. Before this heating system was installed the building had been moved bodily from a former location to a new one on the top of a hill, where, as Mr. Anderson says, "the wind plays freely."

The foundation of the building is poured concrete and concrete blocks. Above the ground level, the first floor consists of exterior walls of weather board on the outside, then building paper, then rough siding on studs. These studs are not covered on the inside.

The second floor and low attic walls are weatherboard, building paper, rough siding, studs and on the inside Celotex. The ceiling of this second floor is also Celotex on wood joists. The attic space is not lined.

One of the real problems of the installation centered around the floors. The garage floor is a heavy reinforced concrete slab which was practically impossible to pierce for enough openings to provide registers at the floor line. The first problem to overcome, then, was how to get heat to this garage floor without having to cut the concrete floor at many points.

The solution came with the decision to use an overhead system for both the first and second floors. This meant that only one opening would have to be made in this floor. Through this opening two stacks—one for the first floor and one for the second floor—could pass. No hole was required for the recirculation duct from the second floor, as the design adopted brought this duct down through the stair well.



This is the distribution system in the attic. Four branches off one trunk are used. Since the attic is cold this trunk is heavily insulated with the approved ½ inch of air cell asbestos. The recirculator grille is located in the stair landing

The second important problem to be solved centered around the removal of every trace of carbon monoxide gas from the garage. With the owner and guests sleeping on the second floor, this removal of gas from five cars had to be complete and certain regardless of outside weather conditions. To solve this problem the owner had a new fireplace built and this brick work carries a flue for gas exhaustion. In addition a furnace flue on the opposite side of the building was erected and this has another exhaust flue.

With these necessary provisions for handling the two principal problems, the heating contractor was free to design his system for efficiency and ease of construction.

The furnace used is a No. 351 XXth Century using coal as fuel. Coal is brought to the bin through a manhole in the garage floor. This is spotted on the plan. The furnace was placed adjacent to the new stack so that only a short run of smoke pipe was required.

The details of the hot side of the installation are interesting. The bonnet of the furnace is connected into a double stack. One of the stacks connects into a rectangular duct through a transition fitting. This duct is taken up through the

concrete floor and up along the outside wall to a point level with the garage ceiling. This ceiling is 9 feet 6 inches above the floor. At the ceiling line a 90 degree turn connects into a rectangular duct which runs along the ceiling ending at a point a little over half way across the garage floor in one large outlet pointed to heat the north end of the garage. This outlet blows against the point of heaviest infiltration. Two-thirds of the volume carried by the duct or 254 square inches are supplied from this outlet.

The other outlet from this trunk is located back against the furnace end of the garage. Here an outlet with 154 square inches of area supplies one-third of the duct volume to the largest section of the garage, but works with infiltration and at the side of least pressure.

The other stack from the furnace goes on up through the garage ceiling and up along the outside wall, then through the second floor ceiling and connects with a transition fitting into an attic trunk of round pipe. This round pipe trunk is carried across the attic floor to a point about half way across.

Four warm air branches are tapped into this pipe. Two are at the end of the duct and are again round pipe. These continue across the attic floor to two central points in the ceiling of the large, second floor club room and exhaust through ceiling registers. The two other stubs are taken off the main trunk at a point just out from the transition fitting. These shorter stubs feed into the kitchen and dining room through ceiling registers.

Because the attic is uninsulated and therefore very cold, the main trunk and the four branches were insulated with ½-inch of air cell asbestos.

No recirculation is taken from the garage floor, of course. Instead, an outside cold air opening is provided in the chimney flue with a weatherproof louvred opening. This louvre faces north and connects into a galvanized iron stack which opens into the basement at a long slant and continues on into the casing. A damper is placed at the shoe so that the duct can be shut off in case of strong north winds which might tend to force cold air through the heater and into the building.

The living quarters on the second floor are provided with recirculation. The grille for this is placed in the stair landing and connects into a rectangular duct which drops into the basement through the stair well.

An interesting detail of this recirculation duct is the use of a baffle between the ash pit and the casing to prevent unusually strong winds from blowing up the recirculation duct and into the stair.

The ventilation system for the garage is simple in design and efficient in operation. At the floor level two vents open into the brick vent flues and so open into the outside air at the top of the chimneys. One of the vents opens directly off the floor into the flue, but the other opens into a rectangular duct which carries the outgoing air through a corner of the locker room and then into the flue.

By Their Wisdom Asses Are Known

(Author Unknown)

AT the beginning of things, when the world was young, the donkey was esteemed by all the tribes of men as wisest of animals. The good Sheik El-Kandee owned a great herd of these sagacious beasts, which was the pride and joy of his life.

Other Sheiks from miles around came to listen and marvel at the wisdom of the herd. At such a time came even the Prophet himself—most learned and wise of all the sons of the East. With much glowing of pride, El-Kandee led him out to the herd and said:

"Behold, O Prophet, the wise and talented asses. Converse with them, test them and see if they are not verily wiser than forty trees full of owls."

Then the Prophet addressed the asses. "Let us test your wisdom," said he. "Answer me this question: What would an ass require for a three days' journey?"

And they counseled among themselves and then made reply: "For a three days' journey, O Prophet, any ass should require six bundles of hay and three bags of dates."

"Very good," quoth the Prophet: "that soundeth like a fair and proper price." Whereupon El-Kandee broke into loud chuckles and said: "Did I not tell you they are passing wise?"

The Prophet answered, "Wait," and he again addressed the asses, "I have for one of you," he said, "a three days' journey, but I will not give six bundles of hay and three bags of dates for making it." Let him who will go for the less stand forth."

And behold, they all stood forth and all began to talk at once. One would go for six bundles of hay and two bags of dates. Then another for three bundles of hay and one bag of dates, until finally one especially long-eared ass agreed to go for one bundle of hay.

Then spoke the Prophet, "Fools," quoth he, "you cannot even live for three days on one bundle of hay, much less profit from the journey."

"True," said the long eared one, "but I wanted to get the order."

And from that far-off day to this, asses have been known as fools, and price cutters known as asses.

Electric Motor Requirements In Modern Heating [Part III]

By H. WEICHSEL

Consulting Engineer, Wagner Electric Corp., St. Louis

Having discussed in general the principles underlying any heating equipment, it is now possible to discuss the manner in which some of the theoretical relations are made use of in practical heating plants.

The warm air furnace method of heating is one of the oldest and was used by the Romans. The development of the steam and hot water centralized heating system, however, was so rapid that there was a period 10 to 15 years ago when it appeared that the hot water or steam heating system would lead the warm air system. Intensive study of the warm air system has reversed the situation and today the warm air system is by far the predominant. The reason for the popularity of this type of heating can be traced to the following:

(1) The initial cost is decidedly less than that for any other type of heating system.

(2) The flexibility and responsiveness is large. There is no system which will respond to a demand for heat as quickly as a warm air furnace plant.

(3) Naturally the amount of air circulation throughout the house creates better air conditions than would otherwise exist.

(4) The humidity of the air can be regulated to suit the demand.

The above are only some of the major advantages. As in everything else, disadvantages also exist. Some of the outstanding ones are as follows:

(1) With a single furnace, the dimensions of the ground plane of the house should not be materially beyond 40x50 feet.

(2) Ordinarily a length of 10 to 12 feet is the maximum permissible length for the pipes or leaders which carry the heat from the furnace to the rooms.

(3) Rooms badly exposed to wind may be difficult to heat unless storm sashes are provided at such windows.

The disadvantages cited are particularly true of the old-fashioned warm air heating system. In the modern plants, means have been provided to overcome these shortcomings or at least to minimize them. In order to obtain this desirable result, the warm air engineer had to call the electric motor to his assistance.

A section through a house provided with a system of warm air, so-called gravity system, is given in

Cross-sectional view of warm air furnace to show correct position of furnace fan in cold air intake.

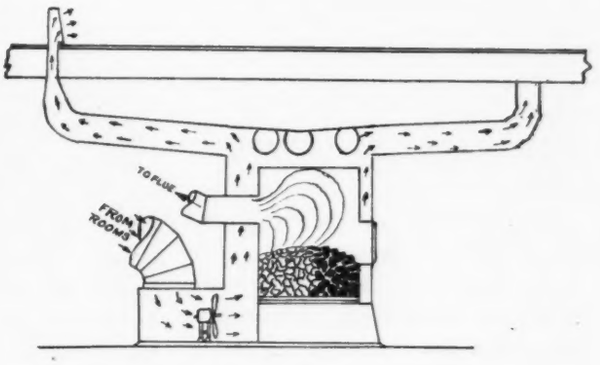
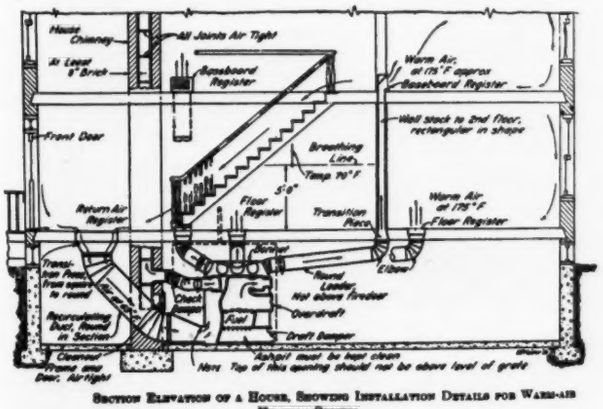


Fig. 45—A typical cross-section of a warm air heating plant with a propeller fan placed in the return air intake. This drawing needs no comment since most readers are familiar with the set-up



SECTION ELEVATION OF A HOUSE, SHOWING INSTALLATION DETAILS FOR WARM-AIR HEATING SYSTEM.
(Note location of the return air register)

Fig. 44 — Cross-section view of a typical warm air heated house. In this installation, typical of older practices, one return air is used at the base of the stairs. Each room has one warm air inlet. The system operates by gravity and is 100 per cent recirculation

Reprinted by permission from "Mechanical Equipment of Buildings," Volume II, by Harding and Willard, published by John Wiley & Sons, Inc.

Fig. 44. A general view of a warm air furnace is given in Fig. 45.

The circulation of the air from the furnace to the room and back to the furnace depends in the gravity system entirely on the difference of weight between the column of hot air in the pipes sending the hot air to the room and the weight of the cold air returning to the furnace. The pressure difference produced by such a gravity system is extremely low and amounts to about .01 inch of water. It is, therefore, readily realized that it is essential to make use of all possible precautions to reduce the air resistance in the piping system.

This means a large cross-section of the pipes and gradual bends. Even if these precautions are taken, it is evident that if a wind rests on one side of the house, an excess pressure occurs in the room adjoining the exposed walls and consequently a less amount of warm air can be furnished to these rooms. This difficulty is a direct outcome of the low pressure head existing in a gravity system. This difficulty can be greatly reduced by forcing the circulation of the air by an electric fan. In the majority of cases, a single fan is placed in the cold air inlet.

Sometimes the fan is placed in one or more of the warm air pipes which lead to the room or rooms which are particularly difficult to heat. Another construction places the fan in the top part of the furnace.

A number of variations exist in each of the two fundamental arrangements just cited. Several fan manufacturers place the fan in the cold air inlet but select the dimensions such that the fan covers only a part of the section of the cold air inlet pipe and the part not covered by the fan can either be opened or closed, which is accomplished by louvres. These louvres close when the fan is in operation and open automatically when the fan is not in operation.

The company with which I am connected uses a single fan located in the cold air inlet and the dimensions are so proportioned that there is sufficient area uncovered by the fan to allow free air circulation, in case fan is not used and system operated by gravity only.

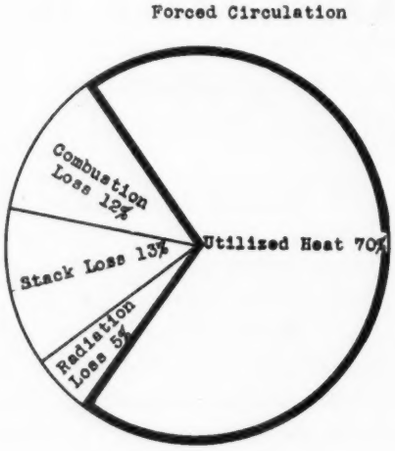


Fig. 54A

This chart shows how the available heat from the furnace is increased by forcing the air past the heating elements with a fan. Bear in mind that the efficiency of the furnace is not affected. This only means that heat is transferred faster and hence more heat units can be carried away

One of the greatest problems in connection with the hot air installation using electric fans for circulating the air is the elimination of noise. The fan as well as the motor are apt to produce noise. It is particularly the fan noise which is conducted through the pipes into the room and not only does this conduction of noise take place through the air in the pipes, but also through the walls of the pipes. This latter part of the noise can quite readily be eliminated by placing sections of canvas in the pipe. The wind noise produced by the fans increases rapidly with fan speed and depends also on the shape of the blades. For this reason many furnace companies prefer slow speed fans.

On the other hand, if a fan is directly connected to the motor, a slow speed fan requires a slow speed motor, which in most cases is not as quiet as a high speed motor. In order to eliminate the transmission of the motor noise to the largest amount possible, the motors are frequently mounted in a resilient manner.

In all cases where an electric fan is installed for forcing the air circulation, the cold air is heated very rapidly and is sent quickly in form of warm air into the rooms. It is evident that it will require less time in the morning to heat a room when the furnace fan is in operation than when it is not. This is one of the great advantages of a furnace fan installation. Furthermore, the fan can be started and stopped automatically by thermostat or by clock at a certain time of the day.

The relatively high velocity with which the air passes over the heating elements in the furnace results in a more economical use of coal.

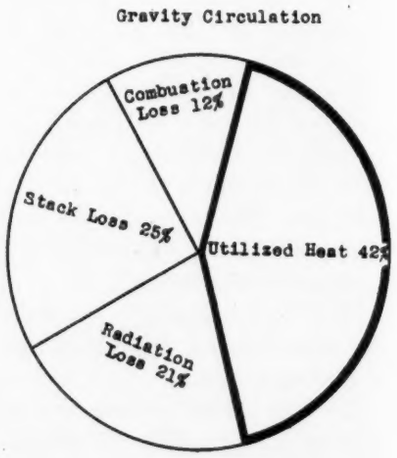


Fig. 54B

By comparison here is the chart showing utilized heat in a typical gravity installation. Radiation loss is increased and utilized heat decreased because the amount of air passing the heating elements is not sufficient to carry off all the heat units generated

A comparison of the utilized heat in a warm air furnace system with and without fans is shown in Fig. 54.

It may be of interest to learn the large amount of water which must be evaporated in order to keep the humidity in the room at a satisfactory value. Fig. 55 gives an idea of the amount of water required. From this figure it will be seen that

for instance a house with a cubical content of 20,000 cubic feet requires about one gallon of water to be evaporated per hour if a room humidity of 40 per cent at a temperature of 65 deg. is desired with an outside temperature of 27 deg. F. During the day, not considering the night time, a total amount of 12 gallons will have to be evaporated, which is quite a large quantity of water.

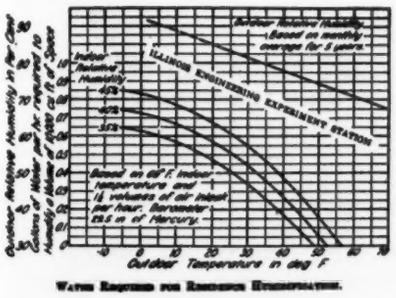


Fig. 55—This chart shows the number of gallons of water required to humidify 10,000 cubic feet of space for varying degrees of outside temperature and three favored percentages of relative humidity

Reprinted by permission from "Mechanical Equipment of Buildings," Volume II, by Harding and Willard, published by John Wiley & Sons, Inc.

In order to give you an idea of the increased amount of air furnished to the different rooms in a building when the furnace fan is in operation, and when it is not in operation, Fig. 56 is shown, which is a copy of an actual test.

By operating the fan in the summer time without having heat in the fire box, a mild circulation of air throughout the building takes place which produces more comfort to the inhabitants. If the cold air inlet is so arranged as to take its air from the basement, a cooling of the building takes place. Tests on an installation are shown in Fig. 57, from which we see that on the first floor a temperature drop of about 5 deg. is obtained when operating the fan and on the second floor a drop of about 7 deg. is obtained when operating the fan.

Outside temperature approximately zero.

First Floor

	Fan Running		Fan Stopped		Ratio	
	Hot Air	Cold Air	Hot Air	Cold Air	Hot Air	Cold Air
Dining room	120	100	22	60	5.5	1.66
Front hall	126	69	off	0	1.83	
		98*		0		
		122*		0		
Living room	108		112		1.	
Sun parlor	140 horizontal		90 horizontal			
	48 vertical		0 vertical		1.5	
Rear hall	closed	9.5	closed	0		
Breakfast room	110		50		2.2	
Kitchen	118		61		2.8	
	722		325		722/327 = 2.2	

Second Floor

	Fan Running	Fan Stopped	Ratio
	Hot Air	Hot Air	
East bathroom	155	158	1
S.E. bedroom	218	226	~1
S.W. bedroom	164	144	1.13
W. bathroom	blocked	0	
N.W. bedroom	no delivery	0	
	82**		
N.W. bedroom	260	248	
	878	778	878/773 = 1.08/1.14

* grating off ** grating off Anemometer over pipe *** after mines had heated

Fig. 56—This chart shows anemometer readings to determine the amount of air furnished rooms in an actual house with the fan running and shut off. Notice that the circulation to the first floor was speeded up to a much greater degree than for the second floor. This is a gravity installation changed over to forced air

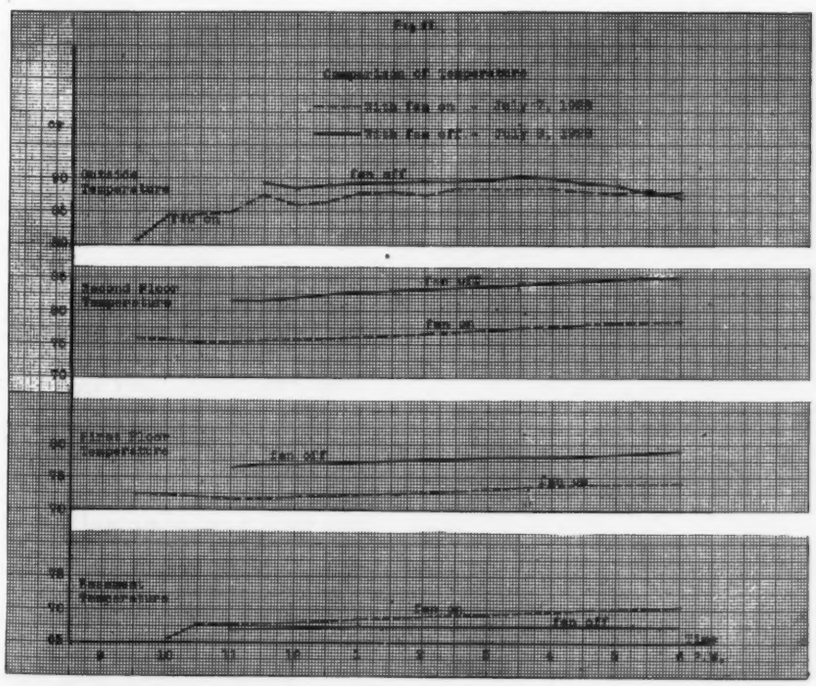


Fig. 57—Here is an interesting chart. Tests were made on a typical installation to determine how much if any decrease in temperature can be expected in summer when a fan runs. The chart shows that over a period of eight hours an average drop of five degrees took place with the fan running for the first floor and an average drop of seven degrees in the second floor. As would be expected, the temperature of the basement was increased with the fan operating. (Published through courtesy of Holland Furnace Company.)

From what has been said, it follows that a modern heating plant requires electric motors in large numbers. The horse-power capacities required for the kind of installations discussed vary from about ⅛ hp. to 5 hp. In the majority of cases, single-phase motors are used. For the large size, polyphase squirrel cage motors are in favor.

CAN YOU TELL ME ?

"Clark Jewel" Oil Stove

From Clark Hardware Company, Windom, Minnesota.

Who manufactures the Clark Jewel oil stove No. 52?

Ans.—Geo. M. Clark & Company, Division American Stove Company, 179 North Michigan Avenue, Chicago, Illinois.

4-Inch Flexible Hose for Suction Cleaners

From The Werner Company, Tracy, Minnesota.

Who manufactures 4-inch flexible rubber hose to be used on a suction cleaner?

Ans.—United States Rubber Company, 428 West Washington Street, Chicago, Illinois.

Steel Lockers

From Glenn Flesher Tin & Sheet Metal Works, Centerville, Iowa.

Where can we buy steel lockers?

Ans.—All-Steel-Equip Company, 12 John Street, Aurora, Illinois; Durabilt Steel Locker Company, 453 Arnold Avenue, Aurora, Illinois; Fred Medart Manufacturing Company, 3546 DeKalb Street, St. Louis, Missouri.

Buck's Stove & Range Company

From Empire Furnace & Stove Repair Company, Inc., Albany, New York.

Can you tell us where the Buck's Stove & Range Company is located?

Ans.—Refer to The Brauer Heating Company, 314-318 North Third Street, St. Louis, Missouri, who have purchased all patterns of the Buck's Stove & Range Company.

Silver Solder in Wire Form

From Prichard Sheet Metal Works, Hoquiam, Washington.

Where can we get silver solder in wire form?

Ans.—Handy & Harman, 57 William Street, New York City.

Allegheny Metal

From P. A. Kennedy, Macomb, Illinois.

Where can we get Allegheny metal?

Ans.—Allegheny Steel Corporation, Pittsburgh, Pennsylvania; *Chicago office:* 122 South Michigan Avenue.

Milk Can Covers

From Air-O-Vac Furnace Cleaner Manufacturing Company, Milwaukee, Wisconsin.

Where can we get milk can covers with convex tops?

Ans.—The Creamery Package Manufacturing Company, 1243 West Washington Boulevard; Geuder, Paeschke & Frey Company, 352 West Ohio Street; both of Chicago, Illinois.

"Refrigerated" Air

From Sydney A. Bonnaffon, Greensboro, North Carolina.

Who manufactures equipment for supplying "refrigerated" air in homes during hot weather?

Ans.—Frigidaire Corporation, General Motors Building, Detroit, Michigan; General Motors Corporation, General Motors Building, Detroit, Michigan; York Refrigerating Division, Carrier-Lyle Corporation, 850 Frelinghuysen Avenue, Newark, New Jersey.

Cast Iron Swivel Unions

From P. A. Schmalz, Harbor Beach, Michigan.

Where can we buy all cast iron swivel unions with standard pipe threads?

Ans.—Edwards Valve & Manufacturing Company, East Chicago, Indiana; Stockham Pipe & Fitting Company, 4700 North 10th Avenue, Birmingham, Alabama.

Canvas Bags for Furnace Cleaners

From Droegkamp Furnace Company, Milwaukee, Wisconsin.

Who in Chicago manufactures large canvas bags for furnace cleaners?

Ans.—H. Channon Company, 149 North Wacker Drive.

Corrugated Metal Covered with Asbestos

From Mr. Hirsch, Chicago, Illinois.

Where can we buy corrugated metal covered with asbestos, to be used as siding on a wall?

Ans.—H. H. Robertson Company, First National Bank Building, Pittsburgh, Pennsylvania; *Chicago office:* 178 West Adams Street.

Roof Insulation

From Modglin Roofing & Heating Company, Metropolis, Illinois.

Where can we buy one-inch thick roof insulation to be used in built-up roofing work?

Ans.—Armstrong Cork & Insulation Company, 120 West Illinois Street; The Celotex Company, 919 North Michigan Avenue; Cork Import Corporation, 400 West Madison Street; Flaxlinum Insulating Company, 165 West Wacker Drive; all of Chicago, Illinois.

Gem Soldering Furnace

From Hoffman's Tin Shop, New Buffalo, Michigan.

Who manufactures the Gem No. 3 gasoline soldering furnace?

Ans.—Burgess Soldering Furnace Company, 229 East Long Street, Columbus, Ohio.

Air-O-Vac Furnace Cleaner

From Earl L. Clements, Washington, Indiana.

Who manufactures the Air-O-Vac furnace cleaner?

Ans.—Air-O-Vac Furnace Cleaner Manufacturing Company, 2101 Eastwood Place, Milwaukee, Wisconsin.

Clipper Lawn Mower

From Roland Coleman, Painesville, Ohio.

Who manufactures the Clipper lawn mower?

Ans.—Clipper Manufacturing Company, Dixon, Illinois.

Wired Skylight Glass

From Modglin Roofing & Heating Company, Metropolis, Illinois.

Where can we buy wired skylight glass?

Ans.—David Lupton's Sons Company, 333 North Michigan Avenue, Chicago, Illinois; Pennsylvania Wire Glass Company, 912 Pennsylvania Building, Philadelphia, Pennsylvania; Pittsburgh Plate Glass Company, 451 St. Clair Avenue, Chicago, Illinois.

NEW ITEMS and NEWS ITEMS
From and about the Manufacturers and Jobbers

New Portable Cleaner from Grand Rapids

A newly organized company, the Grand Rapids Furnace Cleaner Company, 1429 Logan St., S. E., Grand Rapids, Michigan, is now marketing a new portable furnace cleaner.

Among the attractive features of the cleaner is its powerful suction, portability, and reasonable price of $135.00. It is equipped with a half horse power motor suitable for any 110-volt current. It uses a new method whereby all large pieces and most of the dust are left in the dust arrestor which is easily detached from the working parts and removed. This feature eliminates the possibility of broken fans. The outfit is mounted on four rubber casters which facilitates the moving of the machine from room to room. It is equipped with a dust-proof bag, 10 feet of 2-inch hose, three suitable attachments and weighs only 54 pounds.

W. Gunton Moves to Columbus, Ohio

W. Gunton, formerly Sales Manager for the Success Heater Mfg. Company, who, since the first of the year, has been in charge of the western branch of the Midland Furnace Company at Des Moines, Iowa, has just recently moved his family to Columbus, Ohio, arriving there on June 4. This was brought about because of the reorganization made necessary after the merging of the Midland Furnace Company and the Success Heater Mfg. Co.

At a meeting of the Board of Directors held a short time ago, Mr. Gunton was elected Vice-President and Secretary, his principal duty being that of supervising sales as Sales Manager.

C. O. Norland, who has been Secretary and Treasurer of the Midland Furnace Company, was elected President and Treasurer and his principal duties will be the supervising of credits and finance.

Lakeside Co. Announces New Furblo Humidifier

Lakeside Company, Hermansville, Mich., manufacturers of Furblo furnace blower and Lakeside ventilation fans are now manufacturing a new automatic humidifier. A picture of the new unit is shown.

This piece of equipment is built of heavy sheet copper for long service, with the push-pull brass valve enclosed in a brass housing to eliminate rust and clogging. All the principal mechanical parts are outside the furnace bonnet.

The humidifier operates without a float or needle valve. Filling is through an extra large feed valve and pipe.

The humidifier operates on the counterbalance principle. As water in the pan evaporates the pan becomes lighter than the counterweight and rises to open the valve.

The humidifier sells at $19.25 in lots of one to five and decreases in cost for larger quantities. Complete literature describing the humidifier can be had by writing the manufacturer.

Kelsey Secures Approval on Conditionaire Trademark

The Kelsey Heating Company, Syracuse, New York, announce they have just secured approval of the United States Patent Office covering the trademark "Conditionaire" as used on the Kelsey-Bradley all gas fired unit.

The unit covered by this trademark is a gas burning, warm air furnace with patented zig-zag tubes for long fire travel and great heating surface. The heater comes equipped with a special humidifier, an air spray for cleaning and cooling and a centrifugal blower. The system using the Conditionaire is completely forced air.

The unit is enclosed in an octagonal casing and comes in sizes from 180,000 B.t.u. to 320,000 B.t.u. per hour.

Mueller Furnace Company Elects New Officers

At a meeting of the board of directors of L. J. Mueller Furnace Company, of Milwaukee, Wisconsin, on May 19th, the following officers were elected:

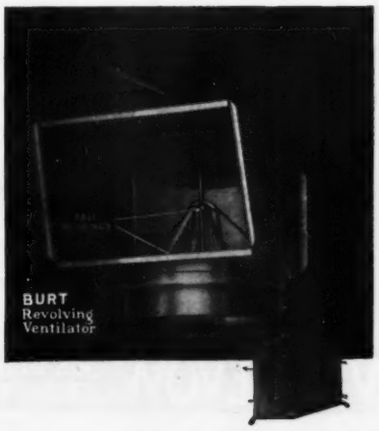
P. E. Mueller, chairman.
H. P. Mueller, pres. and gen. mgr.
G. C. Mueller, vice-pres.
Jos. Schlueter, sec. and treas.
H. P. Mueller, president-elect, succeeds his father, the late L. J. Mueller, Jr., whose death occurred on Monday, May 4, 1931.

Though young in years, having but recently passed his 36th birthday, Mr. Mueller is, in a sense, a veteran in experience in the heating field, having literally grown up in the business of which he is now the head.

Follansbee Brothers Co. Moves Milwaukee Office

Follansbee Brothers Company, manufacturers of steel sheets, tin plate and terne plate have moved their Milwaukee office. The new address is First Wisconsin National Bank Building, Room 700. The telephone will be Daly 3826.

H. H. Wherry, who has represented the company in Milwaukee for the past 24 years, continues as district manager.



BURT ENGINEERS

will help you Increase your Ventilator Sales

It will pay you to take advantage of Burt's Engineering service on your next ventilating job—Their valuable experience, gained from daily contacts with all kinds of ventilating problems, will aid you in making the proper recommendations and help you in closing the business. This service is yours for the asking and will put you in a position to get plenty of sheet metal work that you might otherwise pass by. Remember, ***there's a Burt Ventilator for every purpose.***

ASK FOR BOOKLETS

If you haven't complete information on Burt Ventilators, write today and ask for our latest ventilator booklet. Descriptive literature on each type will also be furnished on request.

The BURT MFG. Co.

Ventilators-Oil Filters-Exhaust Heads

930 S. High St., Akron, Ohio

TO-DAY - - IT'S "AIR CONDITIONING"

SELL

A Complete Air Conditioning Unit

THE AKRON AIR BLAST *and* **ATH-A-NOR AIR CONDITIONING UNITS**

▼

Give the customer what he wants.

Today it's "Air Conditioning."

Install a complete Air Conditioning heating device.

Make it an Ath-A-Nor or AKRON AIR BLAST—The Units that give real Air Conditioning. Clean, Pure, Moist Air—*Warm* in the winter—*Cool* in the summer.

Cash in—on public demand.

▼

Write today for information on *Ath-A-Nor* and *Akron Air Blast Air Conditioning Units.* Let us tell you about our profit making franchise and the complete May-Fiebeger line.

▼

The May-Fiebeger Co.

NEWARK, OHIO

Say you saw it in AMERICAN ARTISAN—Thank you!

X-L-ALL

THE FURNACE WITH THE OVERSIZE COMBUSTION CHAMBER

In 1872, the Deshler Foundry & Machine Works was founded. Since that time, they have worked in steel and are now building a steel furnace with many superior features.

WRITE FOR THIS BOOK — **LEARN ABOUT FURNACES FROM US**

Let us tell you about the evolution of the steel furnace and how the X-L-ALL is built. Write for this unusual book. Let it tell the story of steel furnaces, proper installations, and better profits to you as a warm air heating specialist. Write today.

DESHLER FOUNDRY & MACHINE WKS.
140 SOUTH EAST AVENUE, DESHLER, OHIO

The CHRISTIE is easily carried on back of auto. Can be operated from street by one man. Note 80-ft. pipe run into cellar.

"WE FEEL SAFE IN RECOMMENDING THE

CHRISTIE VACUUM FURNACE CLEANER

because it is the only one that seems to fill the bill," says R. M. Judd, Premier Heater Co., in writing to his dealers. The CHRISTIE is portable, and may easily be carried into basement. As efficient as larger and more expensive equipment, furnishing sufficient power to clean thoroughly without pulling cement from furnace joints. Just the cleaner for progressive furnace men. Write us or one of the following distributors for complete details and price:

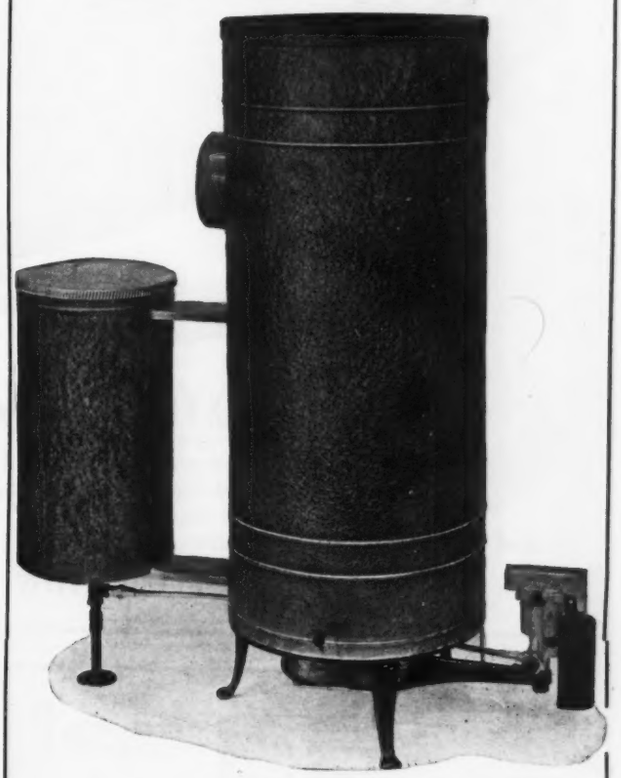
Chicago, Ill.—Chicago Furnace Supply Co., 1278-82 Clybourn Ave.
Cincinnati, Ohio—Cincinnati Sheet Metal & Roofing Co.; Rybolt Heating Co., 813 Broadway.
Cleveland, Ohio—Forest City Foundries Co., 2500 W. 27th Street.
Columbus, Ohio—Harry Hoagland, 1452 Bryden Road.
Dowagiac, Mich.—Premier Warm Air Heater Co.; Rudy Furnace Co.
Indianapolis, Ind.—Hall-Neal Furnace Co., 1322 N. Capitol Ave.; Standard Metal Co., 135-141 S. Penn. St.
Marshalltown, Iowa—Lennox Furnace Co.
Omaha, Neb.—Standard Furnace Supply Co., 407 S. 10th St.
Sewickley, Pa.—Geo. O. C. Roe, Box 165.
Syracuse, N. Y.—Lennox Furnace Co.

CHRISTIE CLEANER COMPANY
Division of The Gottschalk Heating Co.
242 Pike Street Covington, Ky. (Opposite Cincinnati)

Portable, Self-Firing, All-Purpose

OIL HEATER

With Patented Oil Pilot



Safe—Silent—Self-Contained!

NORTHERN Junior Oil Heater

SELL IT NOW for summer cottage, hunting lodge, or brooder house. Sell it *any time*, anywhere, for store, filling station, home garage, or work room. Year-around sales—no installation, no service "grief"—CLEAN PROFIT.

The NORTHERN JUNIOR OIL HEATER burns distillate with thorough combustion. Not dependent on gas or electric service. No moving parts. NO WORK, NO DUST, NO ASHES, NO NOISE. Specially designed for controlled, uniform heat. Equipped with Automatic Draft Regulator . . . with or without a 6-gallon tank attached. No "dull season" with the NORTHERN. Ask for literature, prices, and discounts.

NORTHERN OIL BURNERS, Inc.
Also Mfrs. of NORTHERN AUTOMATIC (Household) OIL BURNER
2441 Hennepin Ave. Minneapolis, Minn.

The LANSING DAILAIRE System

—Another Progressive Step—

Showing Washer on Side of Casing

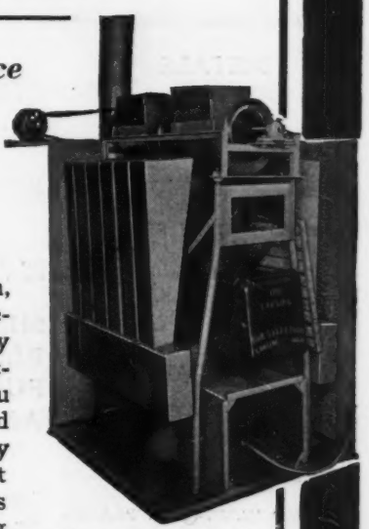
WASHED AIR——————HUMIDIFIED AIR
HEATED AIR——————FORCED AIR
COOLED AIR FOR SUMMER
————IN ONE CASING————

It's More Than Just a Furnace

ADAPTABLE FOR

OIL or GAS

MR. DEALER—Dr. Julius Klein, Assistant Secretary of Commerce, recently said: "The next great industry in this country will be the manufacture of the air conditioner"—If you want to be in step with progress and profits, write today for complete agency information on all sizes of Lansing Dailaire Systems—It delivers complete conditioned air in the home and requires very small space in the basement—Agencies are being assigned rapidly—Better write today.



Showing Interior View of Furnace and Blower

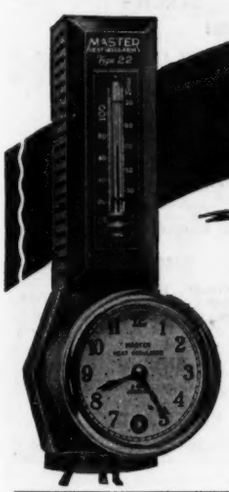
DAIL STEEL PRODUCTS COMPANY
1050 Main Street Lansing, Michigan

The Viking Shear

Compound lever handle—removable blades. Upper blade away from mechanic enabling easy following of work—an exclusive Viking feature.

Sold Under a Guarantee—Send for Particulars

VIKING SHEAR CO., Erie, Pa.



MASTER HEAT REGULATOR

Type 22

FULL ELECTRIC

NOTHING to forget. Instant, close regulation on changes of one degree or less. 8-Day jewelled clock control, $80; plain $55. Both full electric. Also Gradual Operation models.

Write today for details and discounts

WHITE MFG. CO.
2362 University Ave. St. Paul, Minn.

Breuer's Ball Bearing

Tornado Furnace Cleaner

100 Per Cent of All Furnaces Need Cleaning

60 Per Cent of All Furnaces Need Repairing

Facts show that 60 per cent of all furnaces need repairing—but how much of this percentage do you get? The only sure way to get more repair business is by offering TORNADO Cleaning Service at a nominal charge.

You not only make a profit on the cleaning job but you are able to get into the basement and suggest repairs—and even sell new furnaces.

Protect and build your business with TORNADO Cleaning Service. It keeps customers satisfied and brings in new business. The TORNADO Furnace Cleaner is the lightest unit built—weighs only 30 pounds, a one man outfit—lowest in cost, only $149.50 complete—powerful, oversized 2/5 H.P. G.E. Universal Motor mounted on Norma Precision Ball Bearings—10 gallon steel tank dust receptacle mounted on large castors, neatly polished aluminum lid and power unit—easily cleaned—just the cleaner to build profits at low cost. Write for complete information on our three days' free trial offer.

BREUER ELECTRIC MFG. CO.
865 Blackhawk St. Chicago, Ill.
Canadian Representative, HERBERT F. IRWIN CO., INC.,
73 Adelaide St. W., Toronto, 2, Ontario
Dept. C

~ MARKET QUOTATIONS ~

AMERICAN ARTISAN is the only publication quoting Prices on Metals, Sheet Metal Equipment and Supplies, Warm Air Heating Supplies and Accessories, corrected bi-weekly. These quotations are not guaranteed but are obtained from reliable sources and reflect nation-wide market conditions at the time of going to press.

NOTE—These prices are Chicago Warehouse Prices to which must be added territory differentials

METALS

PIG IRON

Chicago Fdy., No. 2	$17.50
Southern Fdy. No. 2	17.01
Lake Superior Charcoal	27.04
Malleable	17.50

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC	20x28	112 sheets	$23.80
IX	20x28		27.45
IXX	20x28	56 sheets	14.95
IXXX	20x28		16.10
IXXXX	20x28		17.35

TERNE PLATES

	Per Box
IC 20x28, 40-lb. 112 sheets	$23.50
IX 20x28, 40-lb. 112 sheets	26.00
IC 20x28, 25-lb. 112 sheets	20.05
IX 20x28, 25-lb. 112 sheets	22.90
IC 20x28, 20-lb. 112 sheets	18.55
IV 20x28, 20-lb. 112 sheets	21.35

"ARMCO" INGOT IRON PLATES

No. 8 ga.—110 lbs.	$4.15
3/16 in.—100 lbs.	4.05
¼ in.—100 lbs.	3.85

COKE PLATES

Cokes, 80 lbs., base, 20x28	$12.00
Cokes, 90 lbs., base, 20x28	12.20
Cokes, 100 lbs., base, 20x28	13.75
Cokes, 107 lbs., base, IC, 20x28	12.75
Cokes, 135 lbs., base, IX, 20x28	14.75
Cokes, 155 lbs., base, 2X, 56 sheets	8.50
Cokes, 175 lbs., base, 3X, 56 sheets	9.35
Cokes, 195 lbs., base, 4X, 56 sheets	10.25

BLUE ANNEALED SHEETS

Base 10 ga. per 100 lbs.	$3.35
"Armco" 10 ga. per 100 lbs.	4.15

ONE PASS COLD ROLLED BLACK

No. 18-20 per 100 lbs.	$3.55
No. 22 per 100 lbs.	3.70
No. 24 per 100 lbs.	3.75
No. 26 per 100 lbs.	3.85
No. 27 per 100 lbs.	3.90
No. 28 per 100 lbs.	4.00

GALVANIZED

No. 16 per 100 lbs.	$3.85
No. 18 per 100 lbs.	4.00
No. 20 per 100 lbs.	4.15
No. 22 per 100 lbs.	4.20
(Standard differentials on extras to apply)	
No. 24 per 100 lbs.	$4.35
No. 26 per 100 lbs.	4.60
No. 27 per 100 lbs.	4.70
No. 28 per 100 lbs.	4.85
"Armco" 24 per 100 lbs.	5.85

BAR SOLDER

Warranted 50-50 per 100 lbs.	$19.25
45-55 per 100 lbs.	17.00
48-52 per 100 lbs.	17.75
Plumbers' per 100 lbs.	15.50

ZINC

In Slabs	$5.00

SHEET ZINC

Cask Lots (600 lbs.)	$12.00
Sheet Lots (100 lbs.)	13.00

BRASS

Sheets, Chicago base	15 ½ c
Tubing, brazed, Chicago base	24 ⅞ c
Tubing, seamless, Chicago base	20 ⅞ c
Wire, Chicago base	16 c
Rods, Chicago base	13 ⅞ c

COPPER

Sheets, Chicago base	17 ⅞ c
Tubing, seamless, Chicago base	20 ⅛ c
Wire, plain rd., 8 B. & S. Ga. and heavier	12 ⅝ c

LEAD

American Pig	$6.00
Bar	7.50

TIN

Bar Tin per 100 lbs.	$33.00
Pig Tin per 100 lbs.	$2.00

SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

ASBESTOS

Paper up to 1/16	5c per lb.
Roll board	5 ½ c per lb.
Mill board 3/32 to ⅛	5 ½ c per lb.
Corrugated paper (250 sq. ft. per roll)	$4.00 per roll

ASBESTOS SEGMENTS

8 in.	per 25 sets	$1.85
9 in.	per 25 sets	2.10
10 in.	per 25 sets	2.35
12 in.	per 25 sets	2.65

CEMENT FURNACE

5-lb. cans, net	$0.40
10-lb. cans, net	0.80
25-lb. cans, net	2.00
Per 100 lbs.	7.50

CLIPS

Damper

No-Rivet Steel, with tail pieces, per gross	$9.50
Rivet Steel, with tail pieces, per gross	7.50
Tail pieces, per gross	2.40

COPPER FOOTING

Copper Footing	43 %

CORNICE BRAKES

Chicago Steel Bending

Nos. 1 to 6B	Net

CUT-OFFS

Gal. plain, round or cor. rd.

26 gauge	30 %
28 gauge	35 %

DAMPERS

Yankee Warm Air

7 inch, doz.	$1.60
8 inch, doz.	2.20
9 inch, doz.	2.60
10 inch, doz.	2.80
12 inch, doz.	3.50
14 inch, doz.	5.00

EAVES TROUGH

Galv. Crimpedge, crated	75-15 %
Zinc	60 %

ELBOWS

Conductor Pipe

Galv. plain or corrugated, round flat Crimp.

28 gauge	60-10 %
26 gauge	50 %
24 gauge	15 %

Galv. Terne Steel

Plain Rd. and Rd. Corr.

28 gauge	60-10 %
26 gauge	50 %
24 gauge	15 %

Square Corrugated

28 gauge	55 %
26 gauge	40 %

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.

Not nested	70 & 5 %
Nested solid	70 & 5 %

Sq. Corr., A. & B. & Octagon

28 gauge	55 %
26 gauge	40 %

Portico

1, 1¼, 1½ inch	45 %

Copper

16 oz. all designs	50 %

Zinc

All styles	60 %

ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue No. 28 Gauge,	Doz.
5 inch	$1.15
6 inch	1.25
7 inch	1.75

Adjustable—Uniform Blue

No. 28 Gauge, Uniform Blue.	
5 inch	$1.60
6 inch	1.75
7 inch	2.10

WOOD FACES—60 % off list.

FIRE POTS

	Each
No. 02 Gasoline Torch, 1 qt.	$ 5.13
No. 9250, Kerosene, or Gasoline Torch, 1 qt.	6.50
No. 10 Tinner's Furnace Square tank, 1 gal.	11.20
No. 15 Tinner's Furnace Round tank, 1 gal.	10.70
No. 21 Gas Soldering Furnace	8.00
No. 110 Automatic Gas Soldering Furnace	10.50

GLASS

Single and Double Strength, A, all brakets	85 %
Single and Double Strength, B, all brackets	87 %

HANGERS

Conductor Pipe

Milcor Perfection Wire	25 %
Milcor Triplex Wire	10 %

Eaves Trough

Steel (galv. after forming) from list	45 %
Selflock E. T. Wire, List	10 %

HOOKS

Conductor

"Direct Drive" Wrought Iron for wood or brick	15 %

MITRES

Galvanized Steel Mitres

28 gauge	70-15 %
26 gauge	70-5 %

PASTE

Asbestos Dry Paste

200-lb. barrel	$14.00
100-lb. barrel	7.50
50-lb. pail	4.25
25-lb. pail	2.15
10-lb. bag	1.00
5-lb. bag	0.50

PIPE

Galvanized

Crated and nested (all gauges)	75-12 ½ %
Crated and not nested (all gauges)	75-7 ½ %

Furnace Pipe

Double Wall Pipe and Fittings	60 %
Single Wall Pipe, Round Galvanized Pipe	60 %
Galvanized and Tin Fittings	60 %

Lead

Per 100 lbs.	$12.50

Stove Pipe

"Milcor" "Titelock" Uniform Blue Stove

28 gauge, 5 inch U. C. nested	$10.00
28 gauge, 6 inch U. C. nested	11.00
28 gauge, 7 inch U. C. nested	13.00
30 gauge, 5 inch U. C. nested	9.25
30 gauge, 6 inch U. C. nested	10.00
30 gauge, 7 inch U. C. nested	12.00

T-Joint Made Up

6 inch, 28 ga. per doz.	$3.40

REGISTERS AND FACES

Floor Registers

Steel and Semi-Steel	40 & 10 %
All Cast Iron	20 %

Baseboard

2-Piece	40 & 10 %
1-Piece	40-10 & 20 %

Adjustable Ventilators

Adjustable Ventilators	40 & 10 %

COLD AIR FACES

Steel and Cast, less than 14" width	40 & 10 %
Steel, 14" and wider	65 & 10 %
Cast, 14" and wider	60 & 10 %
Special Cold Air Faces, Steel or Cast	40 & 10 %

RIDGE ROLL

Galv. Plain Ridge Roll, b'dld	75-15-5 %
Galv., Plain Ridge Roll, crated	75-15 %

SCREWS

Sheet Metal

7, ¼ x ⅛, per gross	$0.52
No. 10, ¼ x 3/16, per gross	0.68
No. 14, ⅜ x ¼, per gross	0.83

SHEARS, TINNERS' AND MACHINISTS'

Viking	$22.00

Lennox Throatless

No. 18	35 %
Shear blades	10 %
(f. o. b. Marshalltown, Iowa.)	

SHOES

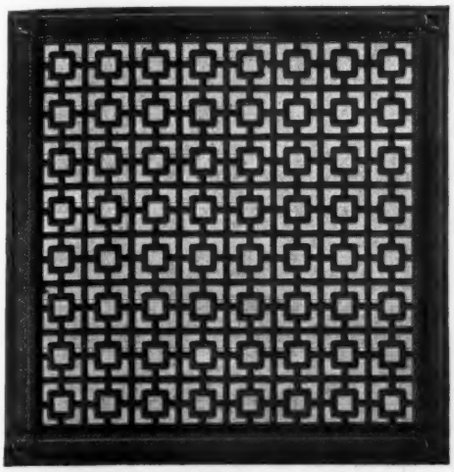
Galv. 28 Gauge, Plain or Corrugated, round flat crimp	60-10 %
26 gauge, round flat crimp	50 %
24 gauge, round flat crimp	15 %

SNIPS

Tinners'	Net

VENTILATORS

Standard	30 to 40 %
Milcor	Net



"GRILFRAME"

Enhances the beauty of any grille by the addition of a border frame of steel. You can do it with "Grilframe." Agents everywhere.

PERFORATED METALS

for every purpose

No matter what the uses we can perforate metal to meet the purpose. In Public Buildings, Churches, Schools, Factories and Homes our grilles are dominant. There are hundreds of designs to select from.

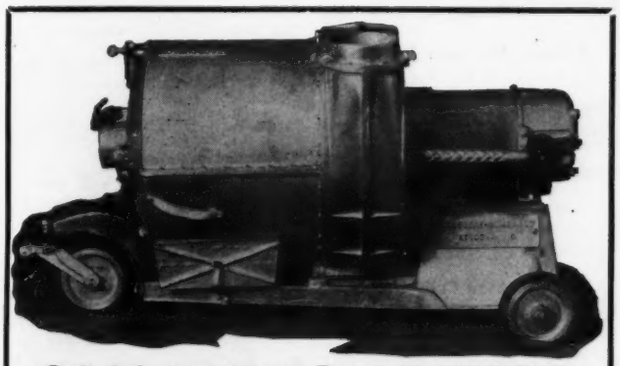
The H. & K. LINE Consists of PERFORATED SHEETS and a Full Selection of SAFETY GUARDS and GUARD ACCESSORIES

WRITE FOR CATALOG AND QUOTATIONS. Perforated metal for every purpose

THE HARRINGTON & KING PERFORATING CO.

5649 Fillmore Street **Chicago, Ill., U. S. A.**

New York Office, 114 Liberty Street



CLEANING POWER

That's what we offer with a "D. Q." Cleaner. Power to perform quickly and satisfactorily. That "Extra Power" which puts a profit in your pocket.

THE "D. Q." CLEANER IS LIGHT IN WEIGHT, BUT POWERFUL IN PERFORMANCE

Fully guaranteed and operates on any ordinary house current A.C. or D.C. 110 to 125 Volts.

Densmore-Quinlan Co.
Kenosha ***Wisconsin***

Write for This Illustrated Folder for Full "D.Q." Data

"Fun for the children..but"

is one of several small folders with which contractors using Anaconda Copper are reminding customers of the economy of durable sheet metal work. Over half a million of these were furnished free to contractors last year, all specially imprinted with their firm names and addresses. The American Brass Company, Waterbury, Conn.

ANACONDA COPPER

Say you saw it in AMERICAN ARTISAN—Thank you!

BUYERS' DIRECTORY

Air Cleaners

American Fdy. & Furnace Co., Bloomington, Ill.
Independent Air Filter Co., Chicago, Ill.
Kleenaire Filter Co., Stevens Point, Wis.
Meyer & Bro., F., Peoria, Ill.
Watt Mfg. Co., Sterling, Ill.

Air Washers

American Machine Products Co., Marshalltown, Iowa
Brundage Co., Kalamazoo, Mich.
A. Gehri & Co., Tacoma, Wash.
Watt Mfg. Co., Sterling, Ill.

Asbestos—Liquid

Technical Products Co., Pittsburgh, Pa.

Asbestos Covering

Standard Asbestos Co. of Chicago, Chicago, Ill.
Wilson, Grant, Inc., Chicago, Ill.

Asbestos Paper

Standard Asbestos Co. of Chicago, Chicago, Ill.
Wilson, Grant, Inc., Chicago, Ill.

Ash Sifter

Diener Mfg. Co., G. W., Chicago, Ill.

Blast Gates

Berger Bros. Co., Philadelphia, Pa.

Blowers

American Fdy. & Furnace Co., Bloomington, Ill.
American Machine Products Co., Marshalltown, Iowa
Brundage Co., Kalamazoo, Mich.
Emerson Elec. Mfg. Co., St. Louis, Mo.
A. Gehri & Co., Tacoma, Wash.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lakeside Co., Hermansville, Mich.
Watt Mfg. Co., Sterling, Ill.

Bolts—Stove

Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Brakes—Bending

Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Brakes—Cornice

Dreis & Krump Mfg. Co., Chicago, Ill.

Brass and Copper

American Brass Co., Waterbury, Conn.
Revere Copper and Brass Inc., Rome, N. Y.

Cans—Garbage

Diener Mfg. Co., G. W., Chicago, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Castings—Malleable

Fanner Mfg. Co., Cleveland, Ohio

Ceilings—Metal

Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Chaplets

Fanner Mfg. Co., Cleveland, Ohio

Cleaners—Vacuum

Breuer Electric Mfg. Co., Chicago
Brillion Furnace Co., Brilion, Wis.
Christie Cleaner Co., Cincinnati, Ohio
Densmore & Quinlan Co., Kenosha, Wis.
National Super Service Co., Toledo, Ohio
Osborn Co., The J. M., & L. A., Cleveland, Ohia
B. F. Sturtevant Co., Boston, Mass.

Conductor Elbows and Shoes

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Rockford Sheet Steel Co., Rockford, Ill.

Conductor Fittings

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Chicago Metal Mfg. Co., Chicago, Ill.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
David Levow, New York, N. Y.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Rival Strap Corp., New York, N. Y.

Conductor Pipe

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Copper

American Brass Co., Waterbury, Conn.
Revere Copper and Brass Inc., Rome, N. Y.
Rockford Sheet Steel Co., Rockford, Ill.

Cornices

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Crimping Machines

Bertsch & Co., Cambridge City, Ind.
Yoder Co., The, Cleveland, Ohio

Cut-offs—Rain Water

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Dampers—Quadrants—Accessories

Aeolus Dickinson, Chicago, Ill.
Hart & Cooley Co., Holland, Mich.
Howes Co., S. M., Boston, Mass.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., New York, N. Y.

Dampproofings

Lastik Products Corp., Pittsburgh, Pa.

Diffusers—Air Duct

Aeolus Dickinson, Chicago, Ill.

Drills—Electric

J. M. & L. A. Osborn Co., Cleveland, Ohio
The Stanley Electric Tool Co., New Britain, Conn.

Drive Screws—Hardened Metallic

Parker-Kalon Corp., New York

Eaves Trough

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Chicago Metal Mfg. Co., Chicago, Ill.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Rockford Sheet Steel Co., Rockford, Ill.

Eaves Trough Hangers

Berger Bros. Co., Philadelphia, Pa.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Flanges

Chicago Metal Mfg. Co., Chicago, Ill.

Fluxes—Soldering

Kester Solder Co., Chicago, Ill.
Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Forming Rolls

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Furnace Cement

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Technical Products Co., Pittsburgh, Pa.

Furnace Chain

Hart & Cooley Co., Holland, Mich.

Furnace Cleaners—Suction

Breuer Electric Mfg. Co., Chicago
Brillion Furnace Co., Brillion, Wis.
Christie Cleaner Co., Cincinnati, Ohio
Densmore & Quinlan Co., Kenosha, Wis.
National Super Service Co., Toledo, Ohio
J. M. & L. A. Osborn Co., Cleveland, Ohio
B. F. Sturtevant Co., Boston, Mass.

Furnace Door Handles

Fanner Mfg. Co., Cleveland, Ohio

Furnace Fans

A-C Mfg. Co., Pontiac, Ill.
American Fdy. & Furnace Co., Bloomington, Ill.
Brundage Co., The, Kalamazoo, Mich.
Lakeside Co., Hermansville, Mich.
Robinson Co., A. H., Massillon, Ohio
Watt Mfg. Co., Sterling, Ill.

Furnace Filters

Independent Air Filter Co., Chicago, Ill.
Kleenaire Filter Co., Stevens Point, Wis.

Furnace Pipe and Fittings

Henry Furnace & Fdy. Co., Cleveland, Ohio
Meyer & Bro., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peerless Foundry Co., Indianapolis, Ind.

Furnace Pokers

Fanner Mfg. Co., Cleveland, Ohio

Furnace Pulleys

Hart & Cooley Co., Holland, Mich.

Furnace Regulators

Hart & Cooley Co., Holland, Mich.
Modern Heat Regulator Co., Cleveland, Ohio
Minneapolis Honeywell Regulator Co., Minneapolis, Minn.
Noll Regulator Co., Youngstown, Ohio
White Mfg. Co., Minneapolis, Minn.

Furnace Rings

Forest City Foundries Co., Cleveland, Ohio

Furnaces for Gas or Oil

Dail Steel Products Co., Lansing, Mich.

Furnaces—Gas

American Fdy. & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Calkins & Pearce, Columbus, Ohio
Henry Furnace and Foundry Co., Cleveland, Ohio
Lennox Furnace Co., Marshalltown, Iowa
Meyer Furnace Co., Peoria, Ill.
Robinson Co., A. H., Massillon, Ohio
Wise Furnace Co., Akron, Ohio
Western Steel Products Co., Duluth, Minn.

Furnaces—Gas Auxiliary

Calkins and Pearce, Columbus, O.
Forest City Foundries Co., Cleveland, O.

Furnaces—Oil Burning

Motor Wheel Corp., Heater Div., Lansing, Mich.

Furnaces—Warm Air

Agricola Furnace Co., Gadsden, Ala.
American Fdy. & Furnace Co., Bloomington, Ill.
Armstrong Furnace Co., Columbus, O.
American Furnace Co., St. Louis, Mo.
Brillion Furnace Co., Brillion, Wis.
Dail Steel Products Co., Lansing, Mich.
Deshler Foundry & Machine Works, Deshler, Ohio
Enterprise Boiler & Tank Works, Chicago, Ill.
Forest City Foundries Co., Cleveland, Ohio
General Heating Co., St. Paul, Minn.
Graff Furnace Co., Scranton, Pa.
Hall-Neal Furnace Co., Indianapolis, Ind.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lennox Furnace Co., Marshalltown, Iowa
Liberty Foundry Co., St. Louis, Mo.
May Fiebeger Furnace Co., Newark, Ohio
Meyer Furnace Co., The, Peoria, Ill.
Midland Furnace Co., Columbus, Ohio
Motor Wheel Corp., Heater Div., Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co. Mt. Vernon, Ill.
Peerless Foundry Co., Indianapolis, Ind.
Premier Warm Air Heater Co., Dowagiac, Mich.
Rybolt Heater Co., Ashland, Ohio
Schwab Furnace & Mfg. Co., Cedar Grove, Wis.
Standard Fdy. & Furnace Co., De Kalb, Ill.
U. S. Furnace Co., Youngstown, Ohio
Waterman-Waterbury Co., Minneapolis, Minn.
Western Steel Products Co., Duluth, Minn.
Williamson Heater Co., Cincinnati, O.
Wise Furnace Co., Akron, Ohio

Grilles

Auer Register Co., Cleveland, Ohio
Chicago Perforating Co., Chicago
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Co., New Britain, Conn.
Independent Register & Mfg. Co., Cleveland
Tuttle & Bailey Mfg. Co., New York
U. S. Register Co., Battle Creek, Mich.

Guards—Machine and Belt

Harrington & King Perforating Co., Chicago, Ill.

Handles—Boiler

Berger Bros. Co., Philadelphia, Pa.

Handles—Soldering Iron

Hyro Mfg. Co., New York, N. Y.

Heat Regulators

Hart & Cooley Co., Holland, Mich.
Modern Heat Regulator Co., Cleveland, Ohio
Noll Regulator Co., Youngstown, O.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
White Mfg. Co., Minneapolis, Minn.

Heaters—Cabinet

Motor Wheel Corp., Heater Division, Lansing, Mich.
Waterman-Waterbury Co., Minneapolis, Minn.

Heaters—School Room

Meyer Furnace Co., The, Peoria, Ill.
Western Steel Products Co., Duluth, Minn.
Waterman-Waterbury Co., Minneapolis, Minn.

Humidifiers

Automatic Humidifier Co., Cedar Falls, Iowa
Diener Mfg. Co., G. W., Chicago, Ill.
Meyer & Bro. Co., F., Peoria, Ill.
Sallada Mfg. Co., Minneapolis, Minn.

(Continued on page 46)

BUYERS' DIRECTORY

(Continued from page 44)

Machinery—Culvert

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Machinery—Rebuilt

Interstate Machinery Co., Chicago, Ill.

Machines—Tinsmith's

Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Rockford Sheet Steel Co., Rockford, Ill.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Yoder Co., The, Cleveland, O.

Metal Lath—Expanded

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Miters

Barnes Metal Products Co., Chicago, Ill.
Berger Bros Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Nails—Hardened Masonry

Parker-Kalon Corp., New York, N. Y.

Oil Burners

Bettendorf Mfg. Co., Bettendorf, Iowa
Bock Oil Burner Corp., Evanston, Ill.
McIlvaine Burner Corp., Evanston, Ill.
Northern Oil Burners Inc., Minneapolis, Minn.
Silent Automatic Corp., Detroit, Mich.

Paint

Connors Paint Mfg. Co., Wm., Troy, N. Y.

Perforated Metals

Chicago Perforating Co., Chicago
Harrington & King Perforating Co., Chicago, Ill.

Punches

Bertsch & Co., Cambridge City, Ind.
Hyro Mfg. Co., New York
Interstate Machinery Co., Chicago, Ill.
Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
W. A. Whitney Mfg. Co., Rockford, Ill.

Punches—Combination Bench and Hand

Hyro Mfg. Co., New York, N. Y.

Punches—Hand

Hyro Mfg. Co., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

Putty-Stove

Connors Paint Mfg. Co., Wm., Troy, N. Y.

Radiator Cabinets

Hart & Cooley Co., New Britain, Conn.
Tuttle & Bailey Mfg. Co., New York

Registers—Warm Air

Auer Register Co., Cleveland, Ohio
Forest City Foundries Co., Cleveland, Ohio
Hart & Cooley Co., Holland, Mich.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Register & Mfg. Co., Cleveland, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Rock Island Register Co., Rock Island, Ill.
Symonds Register Co., St. Louis, Mo.
Tuttle & Bailey Mfg. Co., New York
United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Waterloo, Iowa

Registers—Wood

American Wood Register Co., Plymouth, Ind.
Auer Register Co., Cleveland, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Repairs—Stove and Furnace

Brauer Supply Co., A. G., St. Louis, Mo.

Ridging

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Roofing Cement

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Roof Flashing

Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Roof Paints

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Roofing—Iron and Steel

Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., The, Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Roofing—Tin and Terne

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Rubbish Burners

Hart & Cooley Co., Holland, Mich.

School—Sheet Metal Pattern Drafting

St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating

St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., 200 Varick St., New York

Screws—Hardened Self-Tapping, Sheet Metal

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., New York

Screens—Perforated Metal

Harrington & King Perforating Co., Chicago, Ill.

Scuppers

Aeolus Dickinson, Chicago, Ill.

Shears—Hand and Power

Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Yoder Co., The, Cleveland, O.

Sheet Metal Screws—Hardened, Self-Tapping

Parker-Kalon Corp., New York

Sheets—Alloy

Inland Steel Co., Chicago, Ill.
International Nickel Co., New York, N. Y.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford. Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Aluminum

J. M. & L. A. Osborn Co., Cleveland, Ohio

Sheets—Black and Galvanized

Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Copper

American Brass Co., Waterbury, Conn.
Revere Copper and Brass Inc., Rome, N. Y.

Sheets—Iron

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Copper Bearing Steel

Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.

Sheets—Nickel

International Nickel Co., New York

Sheets—Pure Iron Copper Alloy

Newport Rolling Mill Co., Newport, Ky.

Sheets—Special Finish

Inland Steel Co., Chicago, Ill.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.

Shingles and Tiles—Metal

Globe Iron Roofing and Corrugated Co., Cincinnati, O.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Sky Lights

Globe Iron Roofing and Corrugated Co., Cincinnati, O.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Snips

Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Snow Guards

Berger Bros. Co., Philadelphia, Pa.
David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Solder

Kester Solder Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Solder—Acid Core

Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Rosin Core

Kester Solder Co., Chicago, Ill.

Solder—Self-Fluxing

Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Soldering Furnaces

Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Specialties—Hardware

Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning

Fanner Mfg. Co., Cleveland, Ohio

Stove Pipe and Fittings

Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Stove and Furnace Trimmings

Fanner Mfg. Co., Cleveland, Ohio

Strainers—Roof

David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Straps—Ornamental Pipe

David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Tinplate

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Tools—Tinsmith's

Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.

Torches

Diener Mfg. Co., G. W., Chicago, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Vacuum Cleaners—Furnace

Breuer Electric Mfg. Co., Chicago
Brillion Furnace Co., Brillion, Wis.
Christie Cleaner Co., Cincinnati, Ohio
Densmore & Quinlan Co., Kenosha, Wis.
National Super Service Co., Toledo, Ohio
J. M. & L. A. Osborn Co., Cleveland, Ohio
B. F. Sturtevant Co., Boston, Mass.

Ventilators—Ceiling

Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Reg. & Mfg. Co., Cleveland, O.

Ventilators—Floor

Aeolus Dickinson, Chicago, Ill.

Ventilators—Roof

Aeolus Dickinson, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Burt Mfg. Co., Akron, O.
Paul R. Jordan & Co., Indianapolis, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Wood Faces—Warm Air

Auer Register Co., Cleveland, Ohio
American Wood Register Co., Plymouth, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Say you saw it in AMERICAN ARTISAN—Thank you!

Alphabetical List of Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in alternate issues is marked with an asterisk.

THE BUYERS' DIRECTORY APPEARS ON PAGES 44 AND 46

Classified Advertising

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddie Company, Marshfield, Wis.

For Sale—A complete Hardware and Tin Shop in town of 3000 in best farming community in Ohio. Shop tools consist of 8 foot brake, 30 inch shear, and all other tools necessary. Will sell tools and store fixtures separate or all together. Stock reduced to around $7,500. Address W-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Man, with full set of plumbing and heating tools and a few hundred dollars to invest, wishes to get in with some good firm as manager of shop. Will take shop on percentage if desired. Can handle any job, large or small. Prefer some good town in Illinois. Best of references as to ability, etc. Address K-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Rent, with option to buy if so desired—Fully equipped sheet metal shop in good locality. Owner desires to occupy half of space for other purpose. Will rent on percentage basis. Reliable person with best references need only reply. Address L-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Heating and sheet metal shop in western North Dakota town of 5,000 population. Well equipped shop having a new 8-foot brake and all tools in good condition. A very good opening for an experienced heating man. Other interests reason for selling. Address T-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Sheet metal and plumbing shop. Good location in live Indiana town, 15,000 population. Fully equipped. Terms to responsible party. Address S-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Best equipped general shop in northern Ohio town of 2,200. Very excellent exclusive furnace agency. Seven towns, two cities, Ordnance Depot and Army Camp within 12-mile radius. Other interests compel full attention. Address P-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

HELP WANTED

High grade furnace salesmen calling upon jobbing, sheet metal and furnace trade to handle a national line of Blowers and Air Conditioning equipment, as a full or part time occupation, on a commission basis. Address L-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Manufacturers' Agents

Wanted to sell our furnace cement, roofing paint and cement and calking compounds. Our consistent trade paper advertising is creating demand. Exclusive territory given with liberal commission. Address W-538, AMERICAN ARTISAN, 139 N. Clark Street, Chicago, Illinois.

SITUATION WANTED

Manufacturers Representative

Desires to represent reputable manufacturers on Pacific Coast. Address C-538, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Illinois.

Situation Wanted—By experienced sheet metal worker. Can do roofing, furnace work, and general jobbing. Can furnish references on request. Address W. E. Benninger, c/o J. C. Weston, 53 S. Pearl Street, Youngstown, Ohio. X-537

Situation Wanted—By a competent tinner and plumber with 7 years experience. Can furnish best of references. Prefer Minnesota or Iowa. Address Y-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Situation Wanted—By experienced hardware clerk. Can also install furnaces, and do all kinds of sheet metal work. Prefer Wisconsin. Address General Sheet Metal Works, 523 Bridge Street, Wausau, Wisconsin. A-538

Situation Wanted—By sheet metal worker with 18 years journeyman experience in all general sheet metal work. Can lay out patterns and handle jobs all the way through. Can estimate, and sell jobs. Would consider a good shop on percentage. Prefer Illinois, Address P-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By first class sheet metal worker, plumber, and furnace man with 25 years experience. Married, sober, steady and reliable. Best of references. Address F-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—A first class sheet metal worker and furnace man will give four weeks labor for Board to show his ability to handle the job. Address G-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Situation Wanted—Who wants a first-class, all-around sheet metal worker? Can do furnace and roofing work of all kinds; draft all patterns; neat, accurate, thoroughly experienced and capable; but best proof is actual performance. Prefer shop in well established hardware. Best references. Address G. M. S., 838 Wayne Avenue, Defiance, Ohio. O-538

Situation Wanted—By a first class hardware clerk and salesman. Also good mechanic in shop if needed. Would like to make a change. If you are in need of a capable and dependable man, answer this ad. Address J-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—Position as credit and sales manager, or would consider road job. Age 50, 25 years experience in credits and salesmanship. Would like to correspond with legitimate firm needing such help where the future would be open for a small investment. Address R-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a first class plumber and sheet metal worker. Prefer town or small city in southern New York or northern Pennsylvania. Can do anything under these trades, new or repair work. Can furnish best of references from employer and customers. Address T-537, AMERICAN ARTISAN, 139 North Clark Sreet, Chicago, Illinois.

SITUATION WANTED

Situation Wanted—Have had 26 years experience in the sheet metal and furnace business. Can figure all sizes of work, forced air, gravity, and ventilation. Have knowledge of engineering warm air heating, layouts, pattern cutting, can make own plans, and will go anywhere. Prefer New York, Illinois or Pennsylvania. Am 41 years old, married, three children, steady and reliable. Address H-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

TOOLS AND MACHINES

Wanted—A used Lennox of Marshalltown Throatless Shear, capacity ¼-in. steel motor driven. Also single iron former. Must be in first class condition and priced reasonable. Address E-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—One used Robinson 8-foot cornice brake. Will bend 12 gauge, 8 foot long. Price, $75.00. Address Jacob Brenner, 45-47 Third Street, Fond du Lac, Wisconsin. R-538

For Sale—Complete set of tinner's shop tools. A bargain for anyone wishing to start in this business. Write for prices. Address M-538, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

BOOKS

Here are the two books that most sheet metal workers and contractors classify as the most complete books on Sheet Metal Pattern Cutting. The Universal Sheet Metal Pattern Cutter, Vol. 1, deals with every phase of inside work, including Heating, Ventilating, Blower and Exhaust Piping Connections, Marine Sheet Metal Work, Automobile Sheet Metal Work, Machinery and Belt Guards, etc., Mensuration applied to Sheet Metal Work, etc., with many features of construction and Labor-Saving Methods are also given in detail.

Vol. 2 deals with every form of Outside and Architectural Sheet Metal Work. A treatise on Drawing, Full Size Detailing and Lettering, Construction of Cornices, Skylights, Molding, Copings, Electrically Illuminated Signs, etc.

Cloth bound, 400 pages each volume. Price, $7.50 per volume, postpaid. Order from Book Department. AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

You Can Buy Overton's Simplified Engineering Plans

The articles and stories by Platte Overton, which have proved so interesting, are all based upon a plan of Simplified Engineering. This plan is sold in the form of large blueprints. Each print shows complete plans, data sheet, construction details, etc.

If you would like to know more about this service, write AMERICAN ARTISAN or Platte Overton, care of this magazine.

A
En

S

Up t

5 to

10 to

16 to

21 ro

Up t
feet

50,00

20,00

50,00

70,00

100,0

Duct

Unit

Wh
washe
EQU
above

Wh
contro
HEA
CAS

For
all tru
ing d
sectio
per c

Ad
radiat

ES

R

ESERVOIR

DOOR

ction.

, Ind.

And Now . . .

Engineering Service at Mail Order Prices!

By A MAN WHO KNOWS!

SCALE OF PRICES
Plans

RESIDENCES

Up to and including 5 rooms
$1.10 per room

5 to 9 rooms inclusive
$1.00 per room

10 to 15 rooms inclusive
$0.85 per room

16 to 20 rooms inclusive
$0.80 per room

21 rooms and over
$0.75 per room

CHURCHES

Up to and including 50,000 cubic feet gross content
$0.12 per 1,000 cubic feet

50,000 cubic feet and over
$0.10 per cubic foot

SCHOOLS

20,000 to 50,000 cubic feet
$0.30 per 1,000 cubic feet

50,000 to 70,000 cubic feet
$0.25 per 1,000 cubic feet

70,000 to 100,000 cubic feet
$0.20 per 1,000 cubic feet

100,000 cubic feet and over
$0.15 per 1,000 cubic feet

FACTORIES, GARAGES

Duct systems
$0.12 per 1,000 cu. ft. gross content

Unit heater systems
$0.10 per 1,000 cu. ft. gross content

SPECIAL NOTE

Where heating systems include filters, washers, temperature control as EXTRA EQUIPMENT — add 20 per cent to above prices.

Where filters, washers, temperature controls are A PART OF THE HEATER AND ARE UNDER ONE CASING—listed prices apply.

For complete working plans detailing all trunk lines in $\frac{1}{2}$-inch scale and showing details of elbows, stacks, branches, sections, cross sections of walls—add 50 per cent to list prices.

Add $0.01 per square foot of direct radiation for combination systems.

I ANNOUNCE a dealer engineering service to cover all branches of heating and ventilating — Fan blast systems; Air conditioning systems; Ventilation systems, both fan and gravity; Cooling, drying, humidifying systems; Blow pipe systems; Combination steam, water and vapor systems; Trouble shooting, supervising, testing, consulting service.

I am offering this service on a mail order basis and at unheard of low prices. I will supply complete plans so you can show your buyer just what he is going to get and what the system will look like and how it will work. These plans will save you many dollars in labor, time and material.

At these prices you can afford a consulting engineer's services with every plan you submit. And you can guarantee every installation.

QUALIFICATIONS

Four years as consulting engineer for heating, ventilating and air conditioning on a number of the largest theatres, schools, churches in the middle west.

Approved testing engineer for the Chicago Board of Education.

Twelve years as engineer for several of the largest heating and ventilating contractors.

Three years as chief engineer for heating equipment manufacturers.

Technical education—Armour Institute, Chicago.

Six years as journeyman sheet metal worker.

Contributing writer to American Artisan, Heating, Piping & Air Conditioning, and others.

SPECIAL

I will check your layouts for $2.00 a plan!

HOW TO USE THIS SERVICE

If possible send me architects plans of the building. If you must send sketches, these should be as complete as possible and show dimensions of building, rooms, ceiling heights, locations of doors and windows. Show all floors, glass areas, type of construction, compass points, direction of prevailing winds. In short, show all items considered in Standard Code calculations.

The More Complete the Information—the Better the Layout

Include with your plans all information about the equipment you expect or would like to use. I DO NOT SELL OR RECOMMEND ANY PARTICULAR EQUIPMENT!

List separately or send as a letter all peculiarities of the building, all owners preferences such as furnace location, possible future additions, special room conditions such as especially high temperatures, etc.

If you send tracings on which I can locate the equipment, deduct $1.00 from list prices.

Be sure to mail all material first class postage.

In order to keep the cost to you just as low as possible, bookkeeping service will be practically eliminated. Terms are cash on receipt of the plans.

WHAT YOU WILL GET

Finished plans will be mailed to you within 48 hours after your plans are received in my office.

I will send you one complete set of blue prints showing all floor plans with heater location, duct or leader location and arrangement, stack, register and grille locations and sizes, sizes of all trunks and branches or leaders. Also one complete data sheet to show how the installation was figured.

This material will be assembled so you can show your prospect or architect just what he is getting, how it will look, and how much thought you spent on the project.

You you get an extra set of blue prints for your buyer at $0.04 per square foot.

PLATTE OVERTON

Consulting Engineer

2100 City Hall Square Building **Chicago, Illinois**

With this complete line you can meet every need —

Here is a line of ventilators and skylights that enables you to meet every requirement.

The "Torpedo" Ventilating Skylight is effective as a ventilator and an ideal source of light. By a simple controlling mechanism, a movable shutter quickly and easily regulates the amount of ventilation. Equipped with automatic fire-proof feature.

Milcor skylights are made in a variety of shapes . . . some with the glass laid in putty and others having the *Milcor* "Puttyless" design.

There is also a range of selection in *Milcor* Ventilators . . . to meet particular needs. *Milcor* "Nu-Air" Ventilators have an unusually large capacity for exhausting impure air. No down draft regardless of height of ventilator and direction of wind. Furnished with steel or wired glass top.

Alpina Revolving Syphon and the *Milcor* Uno Turbine Ventilators have remarkable efficiency. Sensitive to air currents . . . revolve on bearings completely enclosed. Drop us a line today for complete information.

MILCOR STEEL COMPANY

MILWAUKEE, WIS., 4117 W. Burnham St. CANTON, OHIO
Chicago, Ill. Kansas City, Mo. LaCrosse, Wis.

Sales Offices: New York, at 100 E. 42nd Street; Boston, Mass., at 136 Federal Street; Atlanta, Ga., at 207 Bona Allen Building; Minneapolis, Minn., at 602-2nd Avenue, So.; Little Rock, Ark., at 104 W. Markham Street

Copper Alloy Steel

MILCOR PRODUCTS

ARMCO

Ingot Iron

Save with Steel